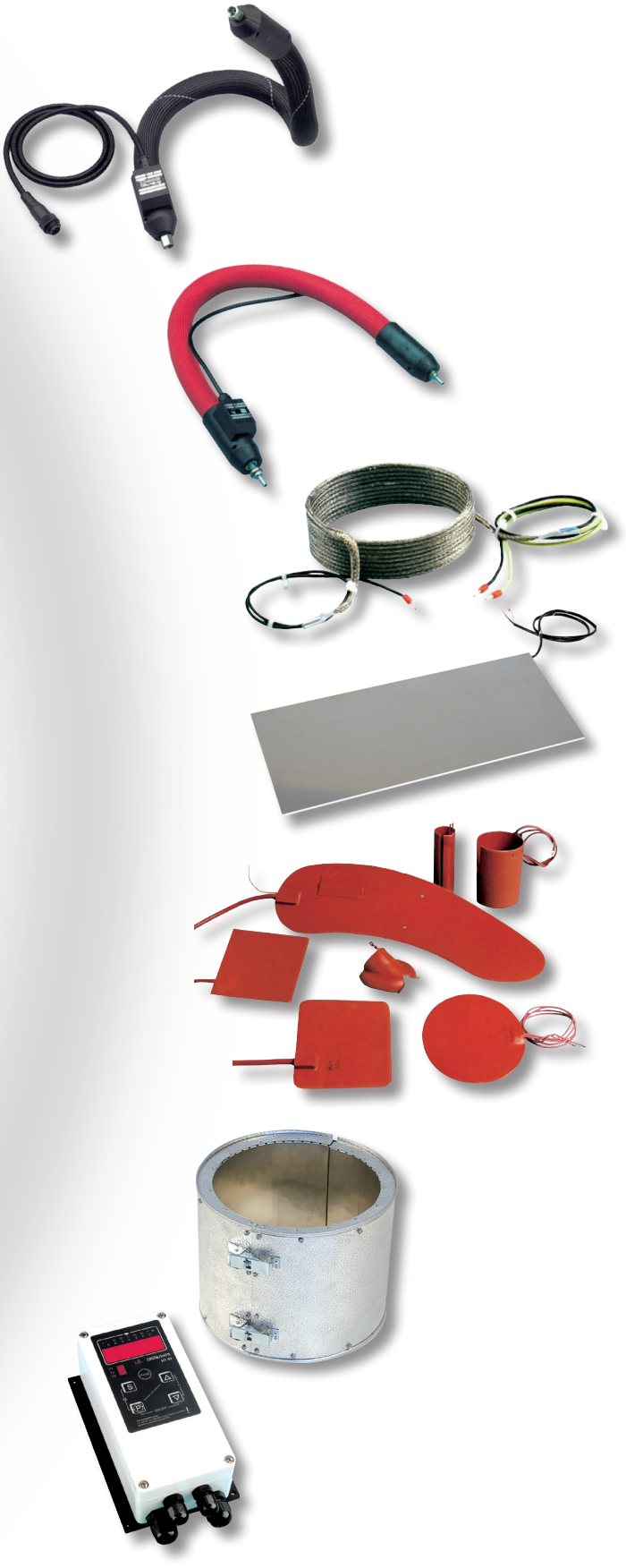
hillesheim

Innovations for heating

Flexible electrical heating



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Your partner for tailored electrical heat

We have specialised in developing and manufacturing flexible electrical heating hoses and tracer heating systems. If you are looking for the technically and economically best solution you should take us into consideration.

In close co-operation with the customer we advice and develop innovative heating concepts and special applications. These are based upon more than 30 years of application practice and thousands of well-established customized solution; a know-how, you can profitally make use of.

Without over 40 employees, an own construction – and service department, 3000 square meters of manufacturing – and storage space we quite regularly present solutions that are some steps way ahead of the so-called “state-of-the-art”.

Reliability and fast delivery of parts are as self-evident to us as the certification according DIN ISO 9001:2000.

We are aware, how important the quality of our tracer heating systems and –components is for your production plants and thus contribute to your success.

Providing heat
Retaining heat

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General Pointer and Facts

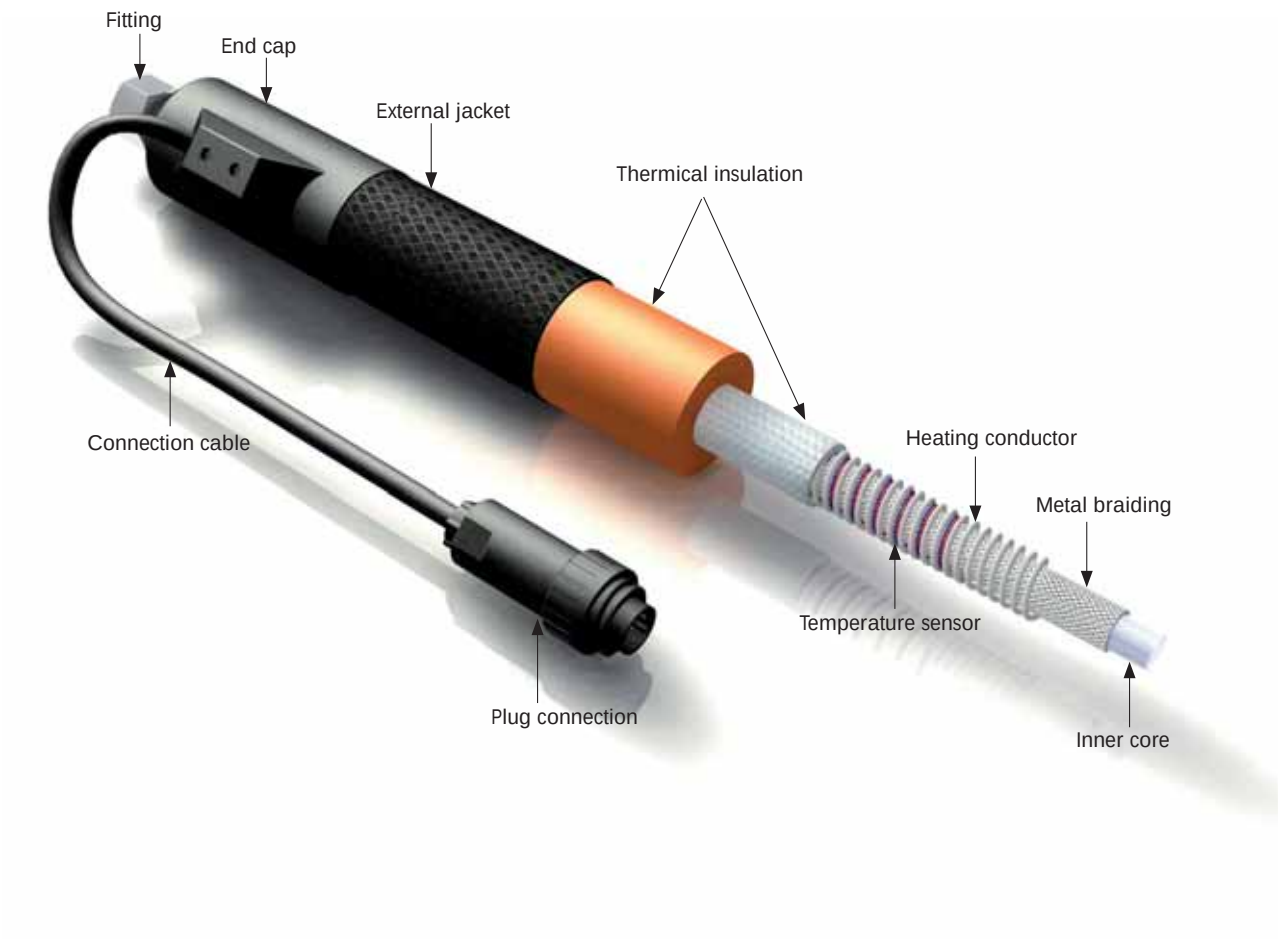
Description and construction of a Hillesheim heating hose

Whenever media needs to be transported from a device or a system to some other part of the device or system, and the piping cannot be rigidly installed, flexible heated hose lines can be used for transportation purposes.

In the majority of applications, it is a requirement to maintain the product temperature at a constant level, irrespective of the temperature fluctuations in the system or the ambient temperature.

Why are heating hoses used:

- so as to keep media flowable for processing
- to achieve their optimum characteristics for processing
- to avoid the formation of condensate in gaseous media
- to process economically
- to ensure uniform quality
- to enable production or measurement at any location
- to connect moving parts and equipment

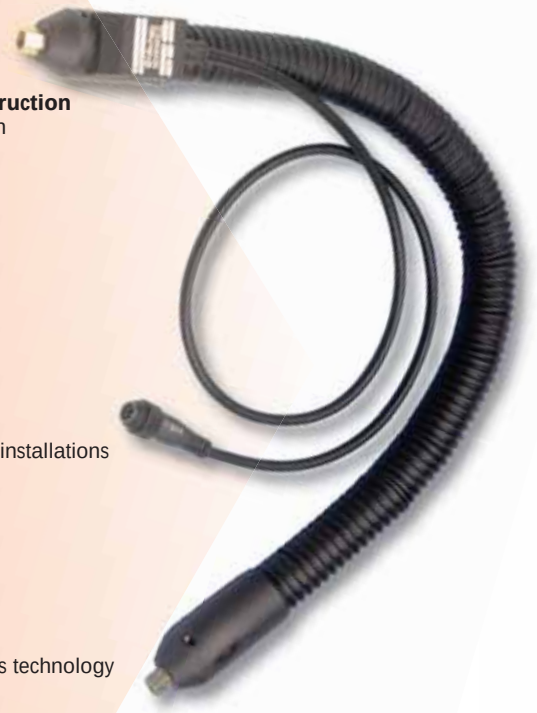


Examples and Fields of Application

Foam installation
wrapper foam, PUR-foam, 2K installations

Transporting technology
HGV, ship loading / unloading hoses
Silo and level compensating hoses

Instrumentation
Exhaust gas measuring and analysing pipes
Sample taking
Smoke-gases



General apparatus construction
Filling and sealing installation
Food processing
Extruder
Co-Extruder

Conection technology
Hotmelt-Installation
Labeling machines
Bookbinding and packaging installations
Glue roboter

Medical technology
Inhalation equiqment, dialysis technology
Labaratory diagnosis
Breathing apparatus

Process technology
Heavy fuel oil installations
Chemical piping
Liquid metals

Surface technology
Glue systems and metering technology in the range of auto body construction
Bitumen installations
Paint spraying installations

Pipe cleaning
Flushing installation
Washing installations
Steam cleaning

Technical Data

Rated power watt/meter at 230 V ~ for standard-heating hoses

Type	DN	4	6	8	10	12	16	20	25	32	40	50
H 100	100 °C	80	100	120	140	160	200	260	330	380	440	550
H 700 H 200 H 800	200 °C 250 °C	100	120	140	160	200	260	330	380	440	550	660
H 900	450 °C			220	250	280	310	400	460	610	660	880
H 400	80 °C	70	70	70	90	90	120	120				
outer-Ø with standard braiding		40	40	40	45	45	50	50	55	60	70	85

Special power and voltage on request.

Rated power watt/meter for analytical heating hoses series H 300

Typ	DN	4	6	8	10	12
H 300	100 °C	100	120	140	160	200
H 300 A+C	200 °C	120	140	160	200	260
H 300	350 °C	200	220	250	280	310
H 300 A	350 °C	220	250	280	310	400

Tolerances

Rated power:	+ 5% / -10%
Diameter:	± 10%
Data length in meter:	± 2%
Testing voltage of heating hoses (230 V allowable stress)	2000 Volt High voltag testing Heating conductor – Safety conductor

Information about Hillesheim heating hoses

Electrical engineering: Power supply and wire whip have been prepared for the specified voltage connection (rated voltage) and the wire whip type. The connection is laid out in accordance with CE standards (DIN-VDE...). Design in accordance with other guidelines can be arranged (UL, CSA, SEV...).

The heating is designed in such a way that an optimal heat distribution is achieved for the entire length.

Heating hoses are fitted with temperature sensors and have to be monitored by suitable control devices. For non-monitored operation we can install additional sensors (bimetal controls, thermal fuses...), or additional temperature sensors to be connected to the controls-limiters combination *(Sicherheit in Elektrowärmeanlagen (Safety in electrical thermal equipment) DIN EN 60619-2 [VDE 0721 Part 411]).*

The design shown on page 2 shows a schematic illustration of the heating hose. The hose type and application may be reason for differences. Additionally the design may differ due to new and further developments.

Please note! Standard heating hoses may not be used in explosion hazardous areas. Our hose series H600 is designed for use in ex-zones 1 and 2 and/or 21 and 22 (page 27), which we can modify correspondingly for your application.

Nominal size: The nominal size (inside diameter) is abbreviated as NW or (English) DN, and is determined by the flow quantity and/or the viscosity of the medium. Standard in PTFE (T1...T4) 4.... 50 mm, stainless steel (T5) from DN6. Larger dimensions are available on request (see also page 31 transfer - unload hoses).

Hydraulic pressure hoses: The hydraulic pressure hose type is mainly determined by the same parameters as the nominal size. Added to this is the operational pressure. Other selection criteria like heat transfers, bending radius or strongly pulsating loads are also important parameters. The table about the bending radius and operational pressure can be found on page 8. We also heat special hoses made of Viton, silicone, NBR... that can be supplied on request.

Attention! → The data is defined for temperatures from 20...50°C. Increased temperatures decrease operational pressure loads; please adhere to temperature correction factors.

Connection fittings: The selection of the fittings is dependent on the nominal size and the operational pressure load resistance of the hose (light, medium and strong fittings range). The standard range is shown on page 6-7. The heating hose may be fitted with different fitting on either side. Additionally open ends without fittings and many types of special type fittings (clamp, flange, milk pipe...) are available on request.

Temperature sensor(s): As standard our heating hoses are fitted with Fe-CuNi (J) thermo elements. As standard we also apply NiCr-Ni(K) thermo elements and PTC sensors PT100 in 2-wire connections (3 and 4-wire connections are possible). Other thermo elements types and PTC/NTC sensors are available on request. Depending on application a variety of sensors can be installed. The HTI or HTP integral action controller will control the temperature directly at the heating wire with PTC behaviour.

Control pipes: The assembly of the heating hose can include a variety of electrical connection pipes, flexible piping for air, test gas or fluid media, even in combination. The entry and exit point and the corresponding connection elements (connections, couplings...) have to be determined. Parallel pickups enable the connection of additional consumers at the same basic guidelines. Conductor cross-sections and pipe diameter depend on the connected consumers.

Connection / plug connection: The access line can be taken out from the end cap as described on page 11. Industrial hoses normally have 1.5 m, analyser connections 3.0 m long connection pipes. Special models with relegated outputs, different dimensions, separate pies for heating, sensors and control pipes .... can be realised.

The heating hose is fitted with a connector that matches our control appliances. Basis is the temperature controller HT43 with a circular connector 6+PE (page 84). Please note that for a non-monitored operation an additional fuse has to be installed in the heating system (limiter, temperature control fuse…).

We can also supply devices without connectors for the connection of clamps or the assembly of customer-specified connectors. We use the connectors of many well-known manufacturers. We can assemble such parts for you, if you state the pin connections with your order specifications.

Heating-up time/safety: Under normal conditions the heating-up time will be between 15 to 30 minutes (enclosed space, approx. 20°C). Before commissioning it has to be ensured that the medium in the hose and the connection points has reached processing temperature. Bending loads and plug-ups in the fitting before reaching the processing temperature may damage the hose.

Before commissioning please read our operational and assembly instructions.

DKR*

Universal conical nipple, union nut inch (BSP) *2

DN (NW)	G = inch thread	
4	G 1/8"-28	G 1/4"-19
6	G 1/4"-19	
8	G 3/8"-19	
10	G 3/8"-19	G 1/2"-14
12	G 1/2"-14	G 5/8"-14
16	G 3/4"-14	
20	G 1"-11	
25	G 1"-11	G 1 1/4"-11
32	G 1 1/4"-11	G 1 1/2"-11
40	G 1 1/2"-11	

RSL / RSS

Pipe connection light / heavy
Duty series for cutting ring

DN (NW)	RSL		RSS	
	L (mm)	d (mm)	L (mm)	d (mm)
4	25	6	27	8
6	25	8	29	10
8	26	10	29	12
10	26	12	29	14
12	28	15	33	16
16	30	18	39	20
20	32	22	44	25
25	30	28	44	30
32	35	35	41	38
40	38	42		

DKL / DKM / DKS*

Universal conical nipple, union nut metric thread
light / heavy duty series

	Inch thread metric = G		
DN (NW)	Thread DKL	DKM	DKS
4	12 x 1,5		
6	14 x 1,5		18 x 1,5
8	16 x 1,5		20 x 1,5
10	18 x 1,5		22 x 1,5
12	22 x 1,5		24 x 1,5
16	26 x 1,5		30 x 2
20	30 x 2	30 x 1,5	36 x 2
25	36 x 2	38 x 1,5	42 x 2
32	45 x 2	45 x 1,5	52 x 2
40	52 x 2	52 x 1,5	

DKJ*

Nipple with 74°-conus JIC, union nut UNF-thread

DN (NW)	G = Thread
4	7/16“ -20 UNF
6	1/2“ -20 UNF
8	1/2“ -20 UNF
8	9/16“ -18 UNF
8	5/8“ -18 UNF
10	9/16“ -18 UNF
10	3/4“ -16 UNF
12	3/4“ -16 UNF
16	7/8“ -14 UNF
20	1 1/16“ -12 UNF
25	1 5/16“ -12 UNF
32	1 5/8“ -12 UNF
40	1 7/8“ -12 UNF

BDN*

Flanged nut flat packing, union nut metric / inch

DN (NW)	G = inch / thread	Thread metric
6	G 1/4"	14 x 1,5
8	G 3/8"	16 x 1,5
10	G 3/8"	18 x 1,5
10	G 1/2"	
12	G 1/2"	22 x 1,5
16	G 3/4"	26 x 1,5
20	G 1"	30 x 2
25	G 1 1/4"	36 x 2
32	G 1 1/4"	52 x 2
40	G 1 1/2"	

The stabity of the heating hose must include the fitting. Normaly, the heating hose fittings are supplied in bichromated, free-cutting steel with Cr-VI free surface coating. Special fittings are available in 1.4305 and 1.4571 and any other materials.
In addition, heating hoses can also supplied with flanges, small flanges, clamps od DIN pipe connection (DIN and ASA*1).
Fittings with an internal coating of PTFE *3 or PFA *4 are available.

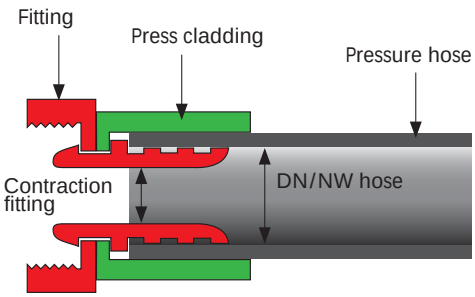
*1 ASA = US-Standard
*2 BSP = British Standard Pipe
*3 PTFE = Polyetrafluoräthylen
*4 PFA = Perfluoralkoxyl

* These fittings are also available as external thread.

DN (NW) hose	Inner Ø mm fitting
4	3,0
6	4,5
8	6,0
10	7,5
12	10,0
16	12,5
20	16,0
25	20,1
32	27,5
40	31,5

Inner Ø may very depending on the fitting

Please note, that the fittings cause a reduction in the hose passageway.



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Pressure Hoses

T 1

Smooth PTFE hose with one braided layer of stainless steel wire, (1.4301) max. working temperature 250°C

hose size	4	6	8	10	12	16	20	25
*working pressure bar	275	240	200	175	150	135	100	80
min. bending radius mm	50	75	100	120	135	160	200	250

T 2

Smooth PTFE hose with two braided layers of stainless steel wire, (1.4301) max. working temperature 250°C

hose size)	6	8	10	12	16	20	25	32	40
*working pressure bar	275	250	225	200	175	150	130	70	50
min. bending radius mm	75	100	120	135	160	200	250	500	850

T 3

Smooth PTFE hose with two wound and one braided layer of steel wire, max. working temperature 250°C, DN 8 to 25 in FEP possible (max. 200°C)

hose size	6	8	10	12	16	20	25
*working pressure bar	500	475	475	450	360	275	225
min. bending radius mm	60	85	110	150	175	200	240

T 4

Corrugated PTFE hose with an insulating layer of stainless steel wire. (1.4301) very flexible

hose size	25	32	40	50
*working pressure bar	77	62	51	34
min. bending radius mm	90	100	150	180

* Temperature correction for T 1 – 4 100°C x 0.9; 200°C x 0.8; 250°C x 0.6;

It is essential that you note the minimum bending radius, since if this is exceeded this will cause the pressure hose to leak thus making the complete heating hose unusable, respectively no longer repairable. We accept no liability for such damage.
The hoses of polytetrafluoroethylene PTFE (Teflon™) can be universally employed in a range from -70°C to +250°C, and are characterised by their unusual chemical stability; they are only unstable in the presence of fluorine compounds, as well as the alkaline metals sodium or potassium and halogens.

T 5

Corrugated refined stainless steel hose (1.4541 or 1.4571) with two braided layers of stainless steel wire, (1.4301), max. working temperature 600°C

hose size	8	10	12	16	20	25	32	40	50
* working pressure bar	176	131	93	85	57	65	46	50	35
min. bending radius mm	125	150	170	190	220	250	290	480	550

* Temperature correction for T 5 100°C x 0.8; 200°C x 0.7; 250°C x 0.6; 350°C x 0.55; 500°C x 0.52

Hoses of stainless steel can be employed virtually without limitation in the range from
-190°C to max. + 600°C for liquid and gaseous media in all industries, and are completely diffusion resistant; not suitable for chlorides, bromides and other halogens.

External Protective Hoses

Polyamide-standard protective braid

material:	PA 6, Polyamide
temperature stability	+150 °C *

Very flexible, deliverable in different colours

Metal protective braid

material:	galvanized steeel or Stainless steel
temperature stability	+300 °C to +500 °C *

Very flexible, very good protection against abrasion

PA-corrugated hose

material:	PA 6 (polyamide)
temperature stability	+90 °C *

Very flexible, recommendable for roboters, non-crush, flame retardant, non halogen

PU-corrugated hose with steel coil

material:	PU (polyurathane)
temperature stability	+90 °C *

Very flexible, recommendable for roboters, non-crush, flame retardant, non halogen

Metal corrugated hose

material:	galvanized steel
temperature stability	+300 °C *

Very flexible, quite heavy, non crush, very resistant against chips and sharp objects.

Textile glass braiding

material:	textile glass – black
temperature stability	+400 °C *

Very flexible, very good protection against abrasion, protection against falling slowing chips etc., standart at series H 900

Silicone-outer skin

material:	Silicone glossy
temperature stability	+200 °C *

Very flexible, glossy surface, easy to lay, moisture proof

* The temperature stability refers to brief contact with a suitably hot environment. The hose structure must be suitably designed in the event of prolonged use above the operating temperature of the hose.

End Caps

Hard cap

Tear- and twist safeguard
The hard cap is firmly bonded with the basic hose. Consequently, there is no tearing or twisting of the cap due to heat expansion or strong movements of the heating hose.

Bending safeguard
Through the hard cap, the bending point of the basic hose is moved well behind the fitting and thus the critical transition between the hose and fitting is neutralised by the hard cap and the time between overhauls of the basic hose is increased.

Connection
The connector of the hard cap has an integrated terminal block, to which you may connect the connecting wires if required. This will enable you to effortlessly change connections without opening the entire connection area.

The hard caps can be supplied for heating hoses up to DN 25.

Option: Miniature control unit HT 54 integrated into the hard cup.

More informations to the HT 54 as listed in chapter 6 Temperature Controllers.

Rated voltage:	230 V / 50 Hz
Switching power:	1000 W / 5 A
Power switch:	Triac in zero passage
Controller area:	0 ... 254°C
Setting:	Rated value 2°C steps above DIP
Display:	Heating operation yellow LED
Housing material:	PA-glass-fibre reinforced
Degree of protection:	IP 42 / sealed-in: IP 65
Controller response:	Two-point-controller
Sensor:	PT 100
Cable inputs:	Cable screws

Soft cap

Temperature stability
The soft cap of silicone or elastomer is characterised by its high temperature stability.

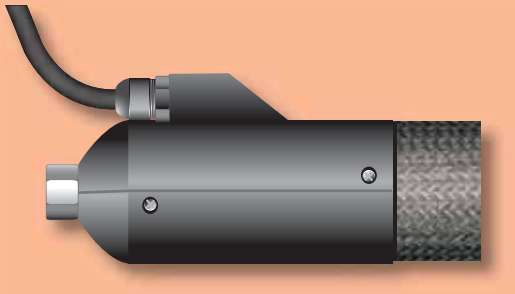
Space requirement
Through their suppleness, they fit snugly around the ends of the heating hose and thus require less space than hard caps.

Anti-kink protection
Through their anti-kink protection and the internal strain relief, they prevent any buckling of the mains connection cable.

The soft caps are available for heating hoses up to DN 50.

Connection Cable Exit

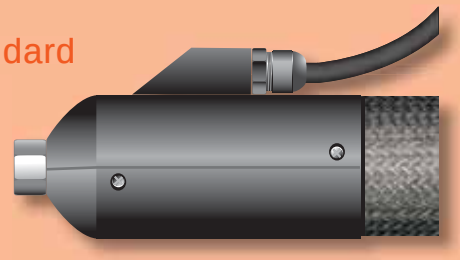
Hard cap



forward

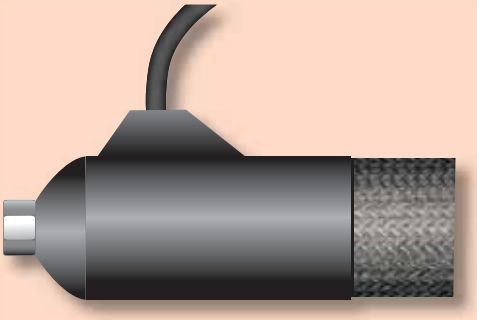
hose sided or frontal

Standard

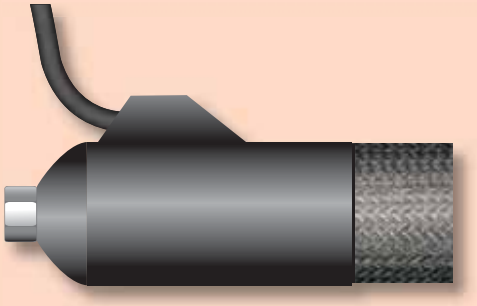


trace back

Soft cap



bent up



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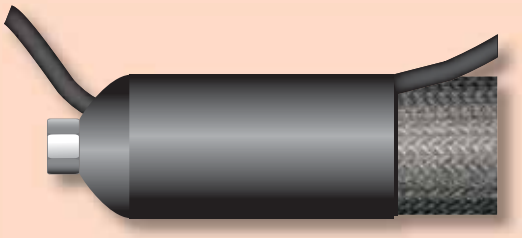
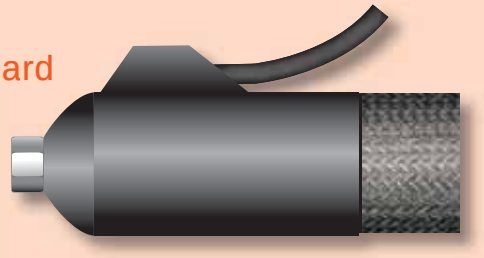


hose sided or frontal

Standard



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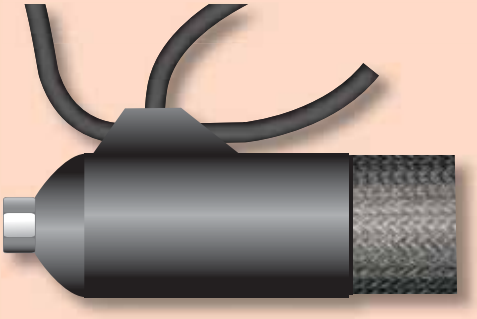

combined

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Order Form

Industrial heating hoses

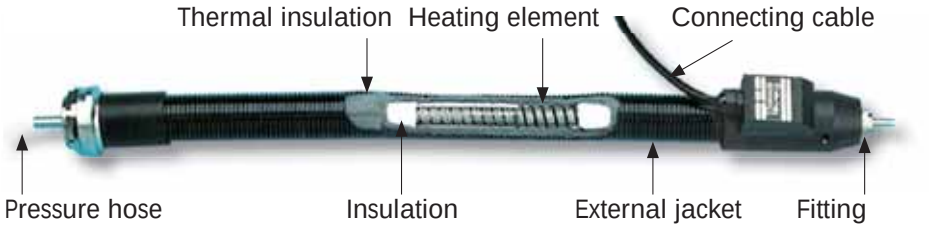
Heating hose	Sensor	External jacket	Fittings	Pressure hose
1 = H 100	0 = Fe-CuNi	0 = Polyamide standard protective braid	0 = without	T1
2 = H 200	1 = Fe-CuNi + limiter	1 = Stainless steel braid	1 = DKR steel	T2
4 = H 400	2 = PT 100	2 = Galvanized steel braid	2 = RSL/RSS-steel	T3
5 = H 500	3 = PT 100 + limiter	3 = PA-corrugated hose	3 = DKR-V2 A	T4
6 = H 600	4 = NiCr-Ni	4 = Metal corugated hose	4 = RSL/RSS-V2 A	T5
7 = H 700	5 = NiCr-Ni + limiter	5 = Textitel glass braiding	5 = DKR-V4 A	
8 = H 800	6 = limiter	6 = PU-corrugated hose	6 = RSL/RSS-V4 A	
9 = H 900	7 = without sensor	7 = Silicone-outer skin	7 = DKJ steel	
	8 = Controller HTI		8 = DKL steel	
	9 = PT 100 + 2. PT 100		9 = BDN steel	

H [ ] [ ] [ ] [ ] – [ ] [ ] [ ] – [ ] - [ ]

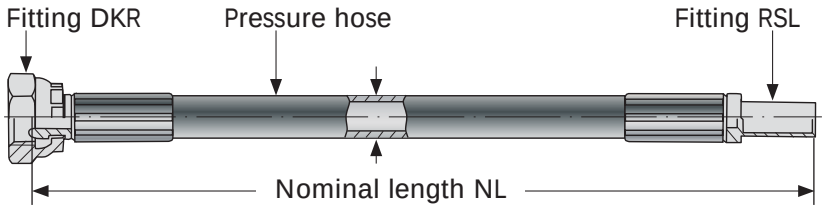
Nominal length in dm DN

Please select product number in the respectively coloured area or manually fill in (nominal length + diameter DN)

Amount [ ]



Definition of nominal length



Pleas fill in complete adress

Company: _____

_____

Salutation: _____

Prename: _____

Surname: _____

Department: _____

Street: _____

Zip-Code: _____ **City:**

E-Mail: _____

Telephone: _____ **Fax:**

Order-fax: 07254/9256-20

Order Form

hillesheim

Analytical heating hoses

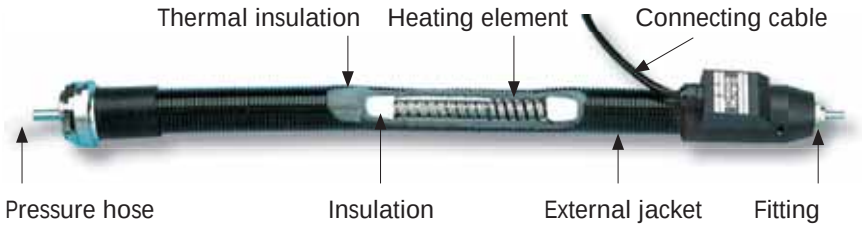
Heating hose	Sensor	External jacket	Fittings	Pressure hose
3 = H 300	0 = Fe-CuNi 1 = Fe-CuNi + limiter 2 = PT 100 3 = PT 100 + limiter 4 = NiCr-Ni 5 = NiCr-Ni + limiter 6 = limiter 7 = without sensor 8 = Controller HTI 9 = PT 100 + 2. PT 100	0 = Polyamide standard protective braid 1 = Stainless steel braid 2 = Galvanized steel braid 3 = PA-corrugated hose 4 = Metal corugated hose 5 = Textitel glass braiding 6 = PU-corrugated hose 7 = Silicone-outer skin	0 = without 6 = RSL/RSS-V4 A A = H 300 A B = H 300 B C = H 300 C	TA-PTFE VA PFA PTFE TA-PFA

H ☐☐☐☐ – ☐☐☐ – ☐ - ☐

Nominal length in dm DN

Please select product number in the respectively coloured area or manually fill in (nominal length + diameter DN)

Amount: ☐



Heating tapes for fittment in H 300 B

HKS 70 Ni ☐

HKSP 40 ☐

HKSI 40 ☐

HBRT ☐

HBRC ☐

Pleas fill in complete adress

Company: _____

_____

Salutation: _____

Prename: _____

Surname: _____

Department: _____

Street: _____

Zip-Code: _____ **City:** _____

E-Mail: _____

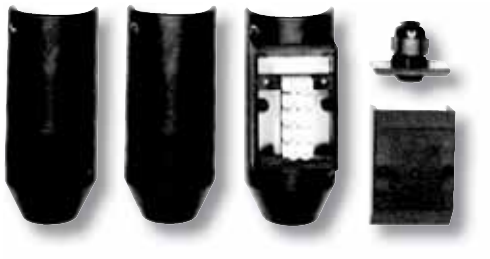
Telephone: _____ **Fax:** _____

Order-fax: 07254/9256-20

Terminal technology for type H 300 Series Analytical heating hoses

for type H 300 A + B + C

Terminal caps of silicone.
3 m connection cable.
Order number H 300 B-S



Terminal caps of polyurethane with terminal block in hard cap.
Available as a self-assembly set.
Order number H 300 B-K

Terminal with heavy-gauge KV screw union at the end.
Order number H 300 B-KVE

Terminal with moveable heavy-gauge KV screw union.
Order number H 300 B-KV

All terminal techniques can be combiened with each other.

Inner core (respectively pipes) for H 300 Series Analytical heating hoses

PFA- 200 °C or PTFE 250 °C
core with 1 mm wall thickness

DN (NW)	4	6	8	10	12
Min. bending radius / mm**	200	250	300	350	400
Pressure / bar*	18	13	10	8	6

Vakuum 8 mbar

VA / VA-Stainless steel 350 °C
core with 1 mm wall thickness (1.4571)

DN (NW)	4	6	8	10	12
Min. bending radius / mm**	300	350	400	500	600
Pressure / bar*	60	60	50	50	40

Vakuum 50 mbar

TA-PFA- 200 °C ore TA-PTFE 250 °C
core with a braiding layer of soft steel wire

DN (NW)	2	4	6	8	10	12
Min. bending radius / mm**	40	50	75	100	120	130
Pressure / bar*	20	20	20	15	15	15

Vakuum 8 mbar

The inner core are partly available in inch.

PTFE = Polyetrafluorethylene
PFA = Perfluoralcoxy

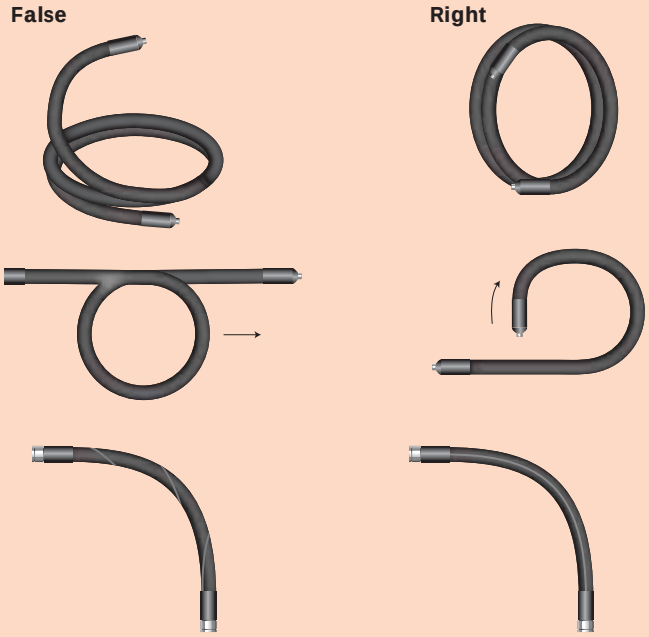
* Temperature correction 100°C x 0.9; 200°C x 0.8; 250°C x 0.7; 350°C x 0.6
** Minimum bending radius under static operating pressure in millimetres Hoses of stainless steel can be employed virtually without limitation in the range from -190°C to max. +600°C for liquid and gaseous media in all industries, and are completely diffusion resistant; not suitable for chlorides, bromides and other halogens.

Modelled after DIN 20066: 2002-10

Pulling on the ends of rolled hoses causes them to build up a torsion stress and can subject them to bending radii smaller than permissible.

Hoses are not to be twisted.

Remedy: Unroll the ring of hose rather than pulling it off.

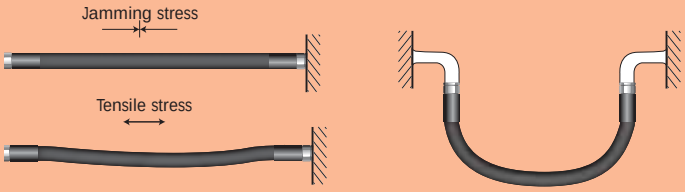


Hose lines should be installed in such a manner that they are free of tensile stress in all operational states; similarly, jamming stress (i.e. axial compression along the length) on short lengths of hose is to be avoided.

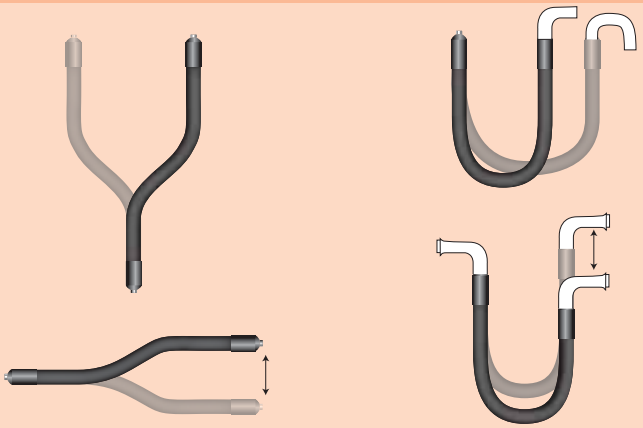
Axial compression due to incorrect installation or space-reducing motion degrades the hose's pressure handling capability.

The expansion of straight runs of hose can lead to their destruction.

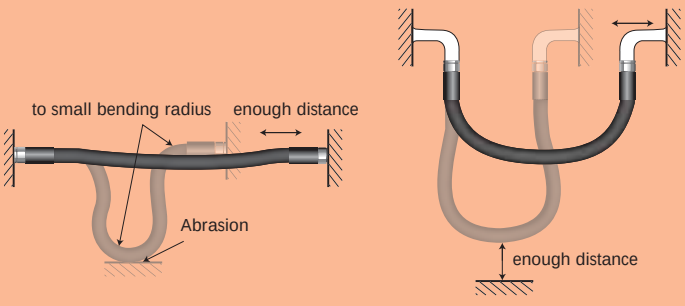
Remedy: place elbow fittings at connecting points



Do not permit straight runs of hose to be subjected to a large range of motion, make such hose connections in a U-shape.

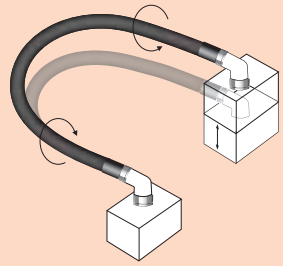


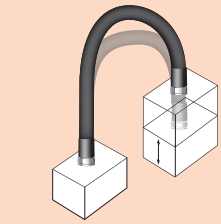
When connecting hose lines to moving parts, hose length must be calculated such that the hose's smallest permissible bending radius is not underrun in any possible position and that the hose is not subjected to tensile stress, i.e. pulling.



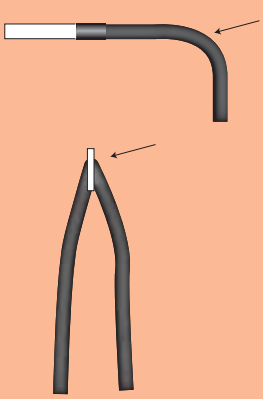
False

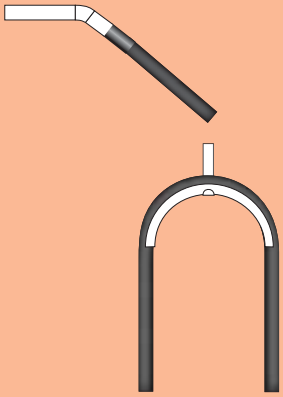
Right





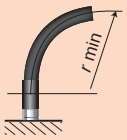
Avoid twisting the hose when connecting it to moving parts, particularly when motion and bending take place in the same plane. This can be achieved through proper installation or structural precautions (e.g. turning knuckle).

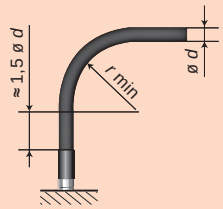




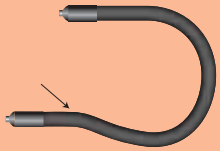
The danger of kinking is particularly great for handheld devices.

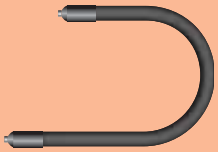
Remedy: Depending on the operating position, introduce an elbow fitting or kink protection (e.g. corrugated metal hose jacketing).

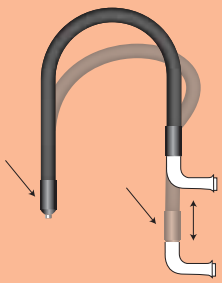


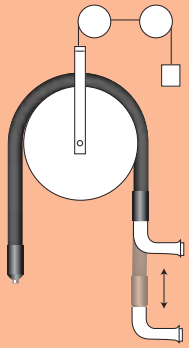


For installation in an arc, a hose length should be selected such that the intended bend can be formed beyond a length of ≈ ≈ 1,5 d_0 ; kink protection may also be necessary (e.g. hard cap).



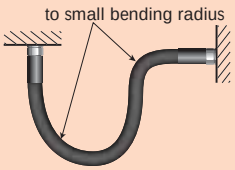


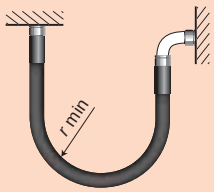




It is disadvantageous to allow free-hanging spans.

Remedy: supports or counterweight rollers.



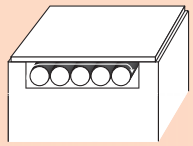


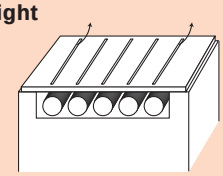
Hose lines should be installed as close as possible to their natural position, although their smallest permissible bend radius must not be underrun.

Additional stresses on the hose can be avoided through the use of suitable fittings and connecting pieces.

Installation Recommendations

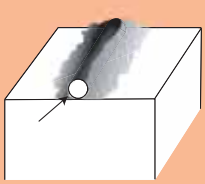
False **Right**

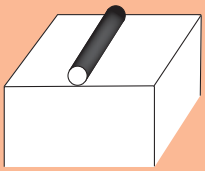




Heat build-up will occur if heating hoses are routed through a closed channel or shaft.

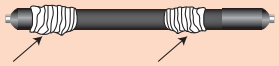
Remedy: hoses may not touch one another. Furthermore, sufficient ventilation is to be provided.



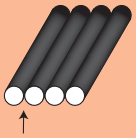


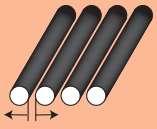
If, for example, powder-like substances, adhesives or other thermally insulating materials accumulate on heating hoses, then overheating will occur at these locations.

Remedy: eliminate the cause with regular cleaning to remove such materials.



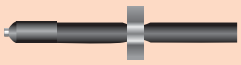
Heat build-up will be caused by surrounding the heating hose with other materials. The heating hose will overheat at such points. If the sensor area is surrounded, then the remainder of the hose will cool off.

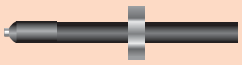


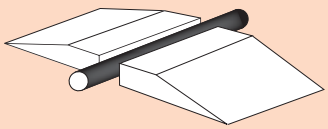


Bundling or routing that permits contact between hoses will lead to overheating at points of contact.

Remedy: route with open space between hoses.



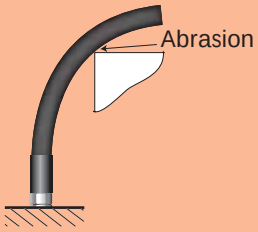


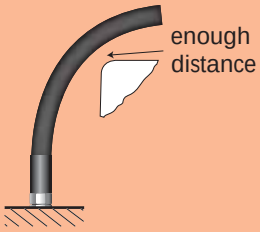


Do not fasten clips or brackets so tightly that they cause the hose's outer braid to be pressed internally against the heat conductor.

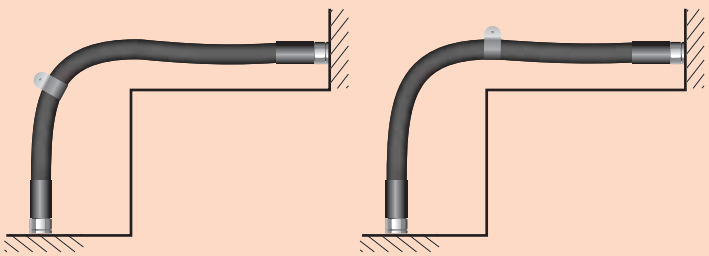
Disregard for this rule can lead to damage of the protective braid and the hose.

Openly routed hose lines along paths where there is vehicle or pedestrian traffic are to be protected against damage from abrasion and or deformation, e.g. by using hose bridges.

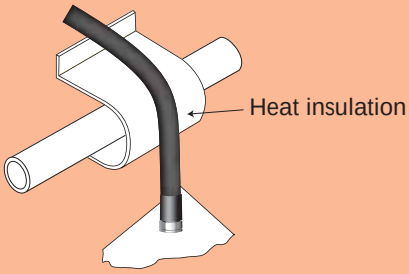




Appropriate measures are to be taken to arrange and affix hose lines to prevent them from being damaged externally by external mechanical influences; this includes the scraping of hoses against components or one another. To the extent necessary, hoses are to be secured in place, for example, by protective jackets. Sharp-edged components are to be covered.



Hose brackets are to be avoided at points where they would prevent the hose's natural free movement and length changes.



Where hose lines are exposed to high external temperatures they must either have sufficient physical separation from the external heat source or be protected by appropriate measures (e.g. shielding).

Protection grade / Protection class

Protection grades for electrical equipment according to EN 60529

Protection grades against solid foreign objects, marked first index		
First Index	**Short description**	**Definition**
0	Non-protected	–
1	Protected against solid foreign objects of 50 mm diameter and greater	The object probe, spere of 50 mm diameter, shall not fully penetrate*)
2	Protected against solid foreign objects of 12,5 mm diameter and greater	The object probe, sphere of 12,5 mm diameter, shall not fully penetrate*)
3	Protected against solid foreign objects of 2,5 mm diameter and greater	The object probe, sphere of 2,5 mm diameter, shall not penetrate at all
4	Protected against solid foreign objects of 1 mm diameter or greater	The object probe, sphere of 1 mm diameter, shall not penetrate at all*)
5	Dust-protected	Ingress of dusts is not totally prevented, but dust shall not penetrate in a quantity to interfere with statisfactory operation of apparatus or to impair safety
6	Dust-tight	No inpress of dust

* Note: The full diameter of the objekt probe shall not pass through an opening of the enclusure

Protections against water, marked second index		
Second index	**Short description**	**Definition**
0	Non-protected	–
1	Protected against falling water drops	Verticaly falling drops shall have no harmfull effects
2	Protected against falling water drops when enclosure tilted up to 15°C	Vertically falling drops shall have no harmfull effects when the enclosure is tilted at any angle up to 15°C on either side of the vertical
3	Protected against spraying water	Water sprayed at an angle up to 60°C on either side of the vertical shall have no harmful effects
4	Protected against splashing water	Water splashed against the enclosure from any direction shall have no harmfull effects
5	Protected against water jet	Water projected in jets against the enclosure from any direction shall have no harmfull effects
6	Protected against powered water jets	Water projected in powerful jets against the enclosure from any direction shall have no harmful effects
7	Protected against the effects of temporary immersion in water	Ingress of water in quantities causing harmful effects shall not be possible wehn enclosure is temporarily immersed in water under standardised conditions of pressure and time
8	Protected against the effects of continuous immersion in water	Ingress of water in quantities causing harmful effects shall not be possible when enclosure is continuously immersed in water under conditions which shall be agreed between manufacturer and user but which are more severe than for numeral 7

Example Index IP 6 8

Protection classes

Electrical device safety requires protective measures to prevent exposed metal parts from conducting electric current in the event of a fault. Classification into protection classes provides information about the given measures taken.

Protection class	Symbol	Protective measures
I		All exposed metal parts are galvanically connected to one another and also connected to the mains protective earth conductor.
II		The device is appropriately isolated such that it has no exposed metal parts that can conduct electric current in the event of a fault. A protective earth conductor is not implemented.
III		The device is operated on low voltage, not in excess of 42 V, which is obtained from a safety transformer or battery.

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Notes

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Heating Hoses

Series H 100 / H 700 H 200 / H 800

250 °C

Standard heating hose

Applications:
Heating or heat-loss free transport of: oil, grease, wax, resin, tar, paint, water, carbon dioxide, plastics, sealants, etc.
Employable pressurised hoses of PTFE from DN 4 to 50 mm; pressure strain depending on nominal width up to 600 bar.

Operating temperature:	**H 100** 100 °C	**H 700** 170 °C	**H 200** 200 °C	**H 800** 250 °C
Rated voltage:	230 V AC / DC (other voltage 12 - 500 V)			
Rated power:	Watts / metre see page 4			
Pressure hose:	PTFE, see page 8			
Fittings:	steel / stainless steel, see page 6 – 7			
Heating:	heating conducter, according DIN, moisture protected, with safety braid			
Thermical insulation:	heat stabilized, compact porous silicone foam up to 250°C elastomere foam up to 100°C			
External jacket:	Polyamid black, options page 9			
End cap:	PA- hard cap or elastomer cap			
Temperature sensor:	Fe-CuNi type J, NiCr-Ni Typ K, PT100 and integral control system (HTI) are possible			
Connecting cable:	1.5 m			
Plug connection:	see schedule page 84			
Manufacturing length:	from 0.3 to 50 m			
Protection grade:	IP 54 (EN 60529)			
Protection class:	I			

Tolerance limits:	
Operating temperature:	±10°C

Temperature control using our control equipment, as listed in chapter 6 Temperature Controllers.

Extended possible use according to customer requirements is possible through special equipment.

H 800 Special 250 °C

Heating hose system for co-extrusion for the plastics industry

Will stand very high temperature and pressure strain.
Series H 800 heating hose systems combined with the series T 3 PTFE pressure hose are particularly suitable as connection hoses between a co-extruder and a tool. Rigid connections and a multiplicity of connection elements are eliminated, which would normally need to be individually heated, insulated and controlled. The flexible connection considerably simplifies tool change and maintenance. The heating system can be easily fitted in your installation..

Operating temperature:	250°C
Rated voltage:	230 V AC/DC (other voltage 12 - 500 V)
Rated power:	for NW 8 140 W/m for NW 10 160 W/m for NW 12 200 W/m for NW 16 260 W/m
Pressure hose:	T3 PTFE, see page 8
Fittings:	Stainless steel, 1.4305; 1.4571; 1.2316; the fitting is tapered and polished, so that no or very little material can be deposited on it. See schedule below
Fittings (optional):	Loose and fixed flange according to DIN and ASA are possible
Thermical insulation:	heat stabilized, compact porous silicone foam up to 250°C elastomere foam up to 100°C
External jacket:	Polyamid black, options page 9
End cap:	PA- hard cap or elastomer cap
Temperature sensor:	Fe-CuNi type J, NiCr-Ni Typ K, PT100 and integral control system (HTI) are possible
Plug connection:	see schedule page 84
Manufacturing length:	from 0.3 m to 40 m
Temperature sensor:	Fe-CuNi type J, NiCr-Ni Typ K, PT100 and integral control system (HTI) are possible
Protection grade:	IP 54 (EN 60529)
Protection class:	I

Tolerance limits:	
Operating temperature:	±10°C

DN	DKS DIN 3863	Pressure load-bearing capability	Interior diameter of the fitting	Bending radius
	heavy-duty universal sealing taper series; cap nuts metric or thread	at 250°C operating temperature		minimum bending radius
8	M 20 x 1,5 / 3/8"	225 bar	6,0 mm	85 mm
10	M 22 x 1,5 / 1/2"	265 bar	7,0 mm	110 mm
12	M 24 x 1,5 / 1/2"	275 bar	10,0 mm	140 mm
16	M 30 x 2 / 3/4"	210 bar	12,5 mm	175 mm

Other fittings and nominal diameters from our fittings table Pages 6 & 7.
Temperature control using our control equipment, as listed in chapter 6 Temperature Controllers.

Series H 900 — 600 °C

Heating hose with stainless-steel pressure hose T 5

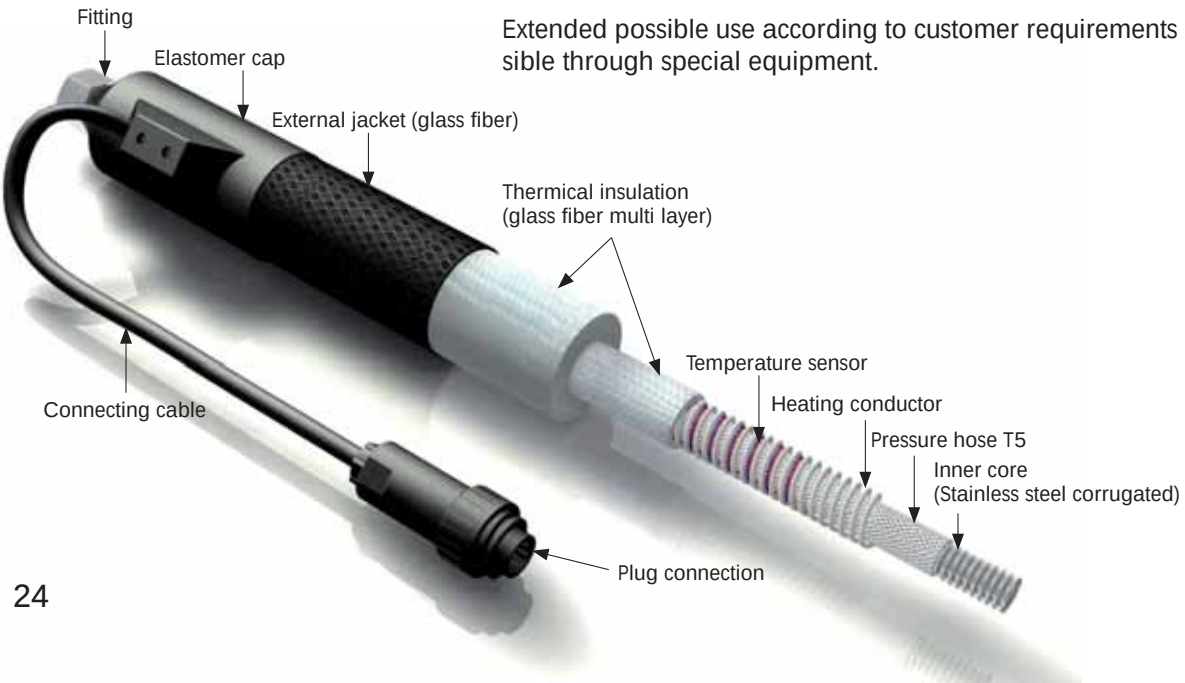
Applications:
Heating or heat-loss free transport of: oil, grease, wax, resin, tar, paint, water, carbon dioxide, plastics, sealants, etc.
The pressure hose made of corrugated stainless steel, allows very high temperatures of up to 600°C. In addition it is diffusion-proof.

Operating temperature:	max. 600°C
Rated voltage:	230 V AC / DC (other voltage 12 - 500 V)
Rated power:	Watts / metre see page 4
Pressure hose:	T5 stainless steel, see page 8
Fittings:	see page 6 – 7
Heating:	heating conducter, according DIN, moisture protected, with safety braid
Thermical insulation:	glass fiber
External jacket:	glass fiber black, see page 9
End cap:	elastomer cap with tension and anti-knik protection
Temperature sensor:	Fe-CuNi type J, NiCr-Ni Typ K, PT100 and integral control system (HTI) are possible
Connecting cable:	1.5 m
Plug connection:	see schedule page 84
Manufacturing length:	from 0.3 to 10 m
Protection grade:	IP 20 (EN 60529)
Protection class:	I

Tolerance limits:	
Operating temperature:	±20°C

Temperature control using our control equipment, as listed in chapter 6 Temperature Controllers.

Extended possible use according to customer requirements is possible through special equipment.



Series H 400 80 °C

Heated twin-hose

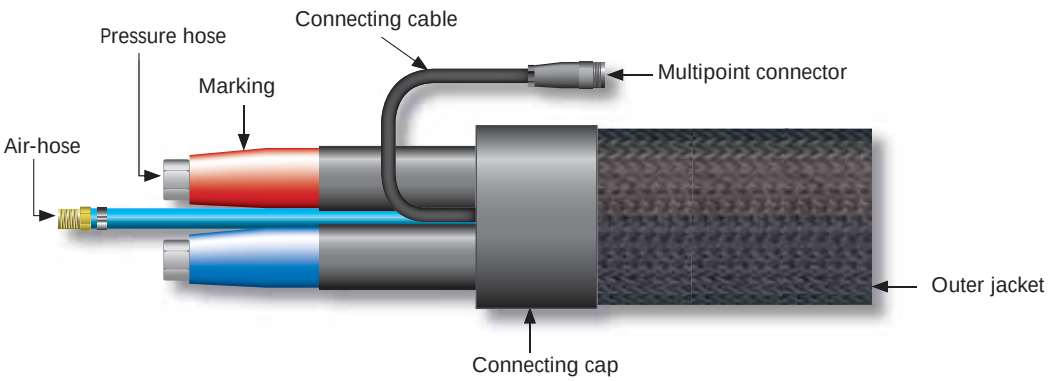
Applications:
Polyurethane foam processing, epoxy resin systems, paint spraying systems, dual-component casting systems.

By heating two separate pressure hoses, cooling down of the components during transportation from the machine to the working position is prevented, and thus their failure to react together in an optimum manner. A pneumatic hose made of PVC, with 6 mm inside diameter and rated for 8 bar pressure, is listed with outer protection.
Special designs will be fabricated to your specifications. Custom designs based on hose series H 100 / 200 are available on request.

Operating temperature:	max. 80°C
Rated voltage:	230 V AC / DC (other voltage 12 - 500 V)
Rated power:	per design
Pressure hose:	PTFE, see page 8
Fittings:	steel / stainless steel, see page 6 – 7
Heating:	heating conducter, according DIN, moisture protected, with safety braid
Thermical insulation:	inner protective hose and elastomere foam
External jacket:	Polyamid black, option: Textile glass braiding End cap: PA- hard cap
Temperature sensor:	Fe-CuNi type J, NiCr-Ni Typ K, PT100 and integral control system (HTI) are possible
Connecting cable:	1.5 m
Plug connection:	per hose one plug, see schedule page 84
Manufacturing length:	7.5m / 15m / 30m / 60m, other lengths possible
Protection grade:	IP 54 (EN 60529)
Protection class:	I

Tolerance limits:	
Operating temperature:	±10°C

Temperature control using our control equipment, as listed in chapter 6 Temperature Controllers.



Series H 500 — 100 °C

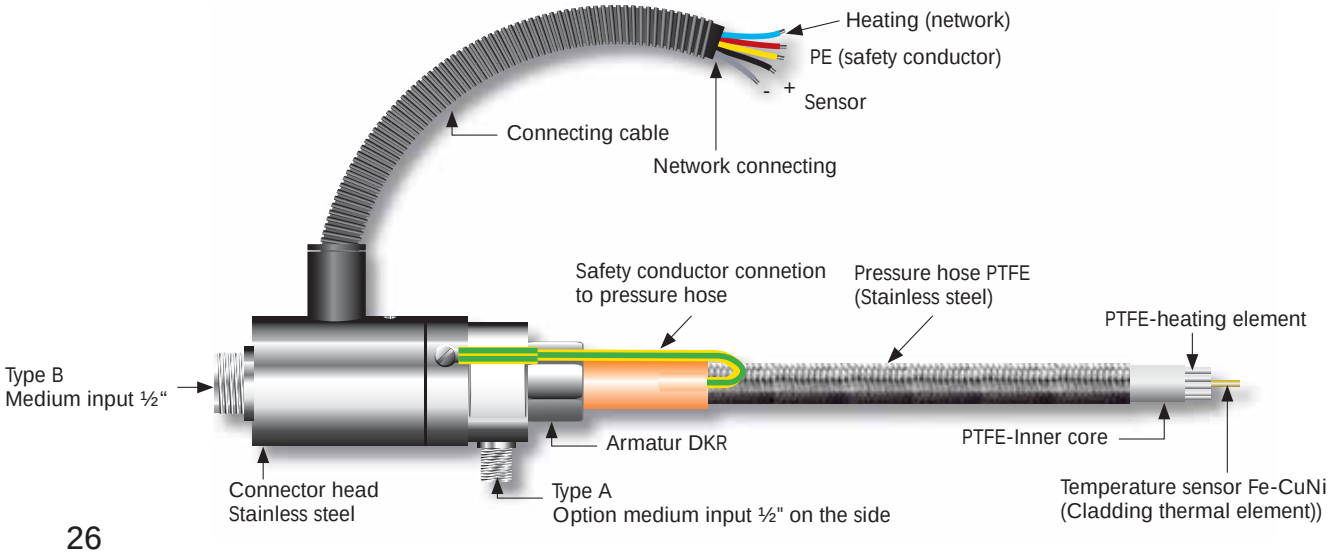
Heating hose with internal heating

Applications:
Low-viscosity and gaseous media such as water, oil, lye, acid or air. The heating as well as the temperature sensors inside the hose have direct media contact. An optimum heat transfer is thus ensured. The external diameter is very low due to this design.
No thermal insulation is required up to a usage temperature of 60°C.

Operating temperature:	max. 100°C
Rated voltage:	230 V AC / DC (other voltage 12 - 500 V)
Rated power:	100 – 200 W / m
Pressure hose:	PTFE NW 6 to 16mm, see page 8
Fitting:	AG and. ÜBW ½" or ⅜"
Connector head:	stainless steel or steel zinced / 100 bar
Heating:	heating conducter, PTFE isolated
Thermical insulation:	without, applyable up to 60°C
External jacket:	stainless steel of the main hose
Temperature sensor:	Fe-CuNi type J, NiCr-Ni Typ K, PT100 and integral control system (HTI) are possible
Connecting cable:	1.5 m
Plug connection:	see schedule page 84 Fuse: on the part of the builder - Fi-switch
Manufacturing length:	from 5 to 30 m
Protection grade:	IP 54 (EN 60529)
Protection class:	I

Tolerance limits:	
Operating temperature:	±5°C

Temperature control using our control equipment, as listed in chapter 6 Temperature Controllers.



H 600 Ex 65 °C / 120 °C / 200 °C

Heating hose with explosion approved heating conductors

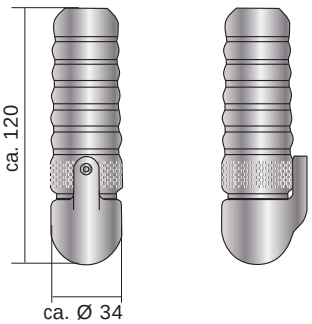
As a matter of principle, this heating hose must be operated with a governor / limiter system. Ex-PT 100 allows H600 heating hose to be used with our HT 42 regulator units. However, the regulator must then be installed outside the explosion hazard area.
These specially designed heating hoses can be operated with degree of protection “Special protection” (Ex)s up to the maximum 200°C temperature category T 3.

Operating temperature:	max. 65°C / 120°C / 200°C
Rated voltage:	230 V AC / DC (other voltage 12 - 500 V)
Rated power:	per design
Pressure hose:	PTFE, see page 8
Fittings:	see page 6 – 7
Heating:	heating conducter PTFE insulation, VDE-controlled, constant resistor
Thermical insulation:	heat stabilized, compact porous silicone foam up to 250°C elastomere foam up to 100°C
External jacket:	Metal protective braid or PU – corrugated hose
End cap:	PA- hard cap or elastomer cap
Temperature sensor:	2x PT 100 controller / limiter
Connecting cable:	1.5 m
Plug connection:	none
Manufacturing length:	from 3 to 50 m
Connector sockets:	PTB-license

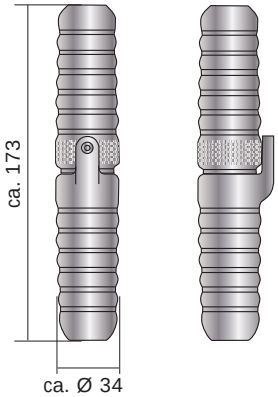
Also available are Ex-heating hoses with self-limiting tape-type heaters, series HBR.
Designs up to 65°C and 120°C. On these designs, costly explosion control equipment is not required, since these heating hoses are self-limiting.
Explosion protection T 3, T 5, T 6, PTB approval.

Temperature controller HT 42, as listed in chapter 6 Temperature Controllers.

Closing off



Connection / Extension



HDM 95 / 200 95 °C / 200 °C

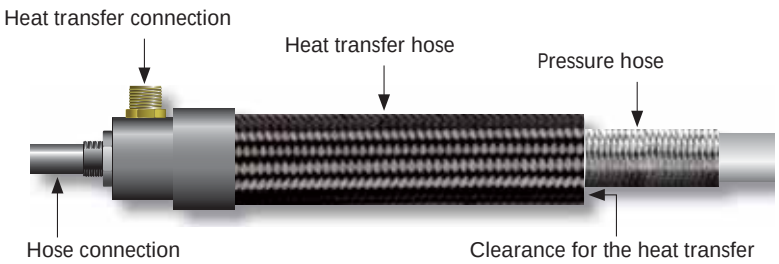
Double-jacket heating hose

Applications:
Explosion endangered areas.
The HDM hose can be used as a HEATABLE ELEMENT, as a COOLABLE ELEMENT and as a SAFETY ELEMENT.
To use the HDM heating hoses, you need a temperature stabilizer that operates with circulated steam, water or heat carrier oil.

Operating temperature:	95°C / 200°C
Pressure hose:	PTFE, see page 8
Fittings:	RSL socket stainless steel
Temperature carrier conn.:	AGR ⅜" up to ½"
Temperature carrier hose:	Elastomer hose 95°C PTFE hose 200°C
Temperature carrier:	water, oil, 8 bar max.*
Outer diameter:	DN 4 – 10 ca. 35 mm DN 12 – 16 ca. 45 mm DN 20 – 25 ca. 55 mm
Bending radius:	DN 4 – 10 200 mm DN 12 – 16 400 mm DN 20 – 25 500 mm
Manufacturing length:	from 0.5 to 25 m
Option:	Thermal insulation with 10 mm foam insulation and PA external braid; end caps on both sides; special pressure hose TA / DN 2 mm

* The pressure detail is valid for the heat carrier material within the outer hose when the inner hose is filled and is under operating pressure. Between the outer hose and the inner hose a negative pressure difference must not be produced, i.e. the pressure in the inner hose must always be higher than that in the outer hose. In the event of a negative pressure difference (e.g. during filling), the inner hose can collapse. Where a negative pressure difference is unavoidable, the inner hose can be optionally provided with an external covering. Through the external covering, the pressure is distributed on the surface of the stainless steel braiding thus preventing the inside from collapsing.

For internal pressure hose T 3 please use only oil or another heating medium. **! No water !**

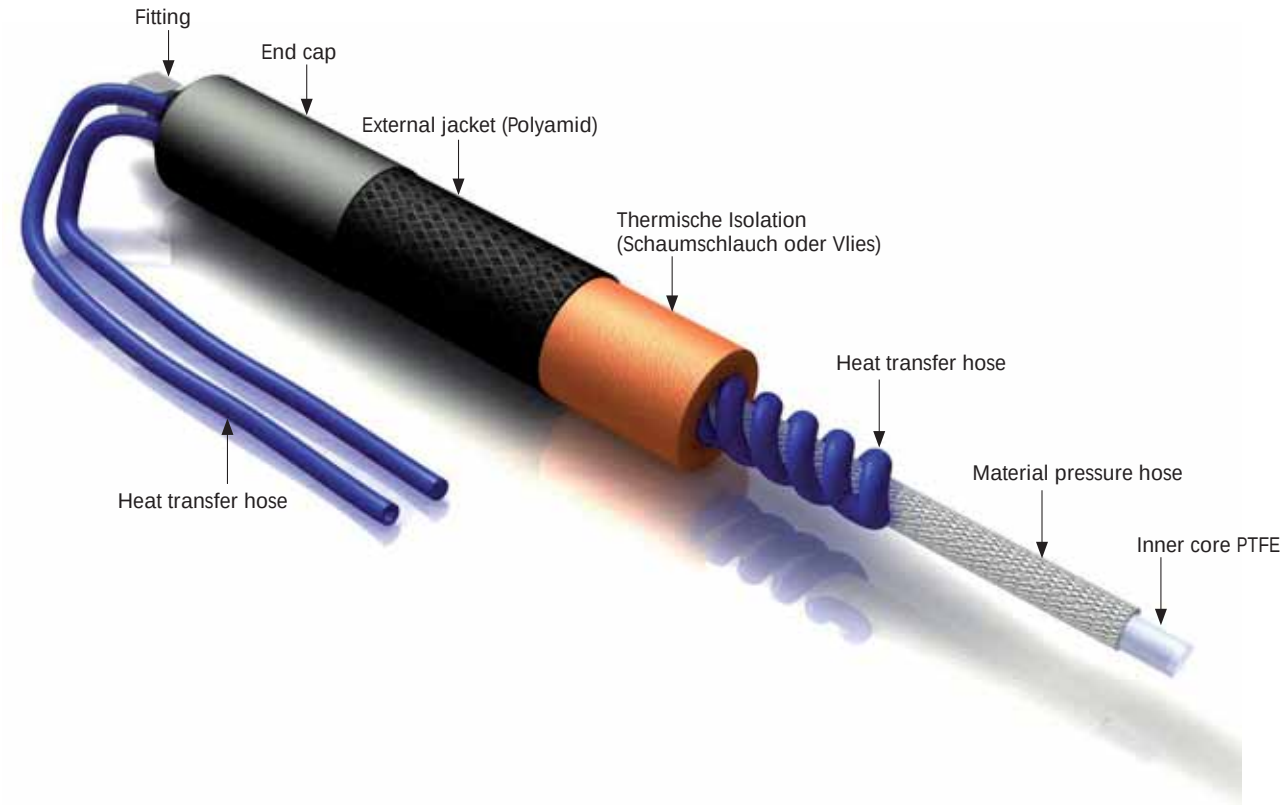


HDM 60 / 62 60 °C / 200 °C

HDM 60 / 62 heat transfer hose

The HDM hose can be used as a HEATING or as a COOLING ELEMENT and it is suitable for use in explosion hazard areas as well. A temperature regulating unit which works with steam, water or heat-transfer oil in a circulating system is required to operate HDM as a heating hose.
A 6 mm pressure hose is tightly coiled around the material hose. It is this coiled pressure hose in which the heat transfer fluid flows in order to heat the material in the material hose. This construction precludes the type of fault which would allow an intrusion of heated material from the material hose into the heat transfer circulation system to destroy the temperature regulating unit.

Operating temperature:	60 °C / 200 °C
Materialpressure hose:	PTFE, DN 8 to 50 see page 8
Fitting Material hose:	see page 6 – 7
Heat transfer hose:	HDM 60: PUR 6 mm Ø 60 °C HDM 62: PTFE 6 mm Ø 200 °C Single or double ended temperature regulation lines extending 1.0 m out of the material hose, maximum pressure 8 bar
Fitting Heat transfer hose:	AG ¼“, ÜBW ¼“ Special fittings are available
Thermical insulation:	Fleece or Foamhose
External jacket:	Polyamid black, see pape 9
End cap:	PA-hard cap or elastomer cap



Series HR 900 °C

Heated pipe systems

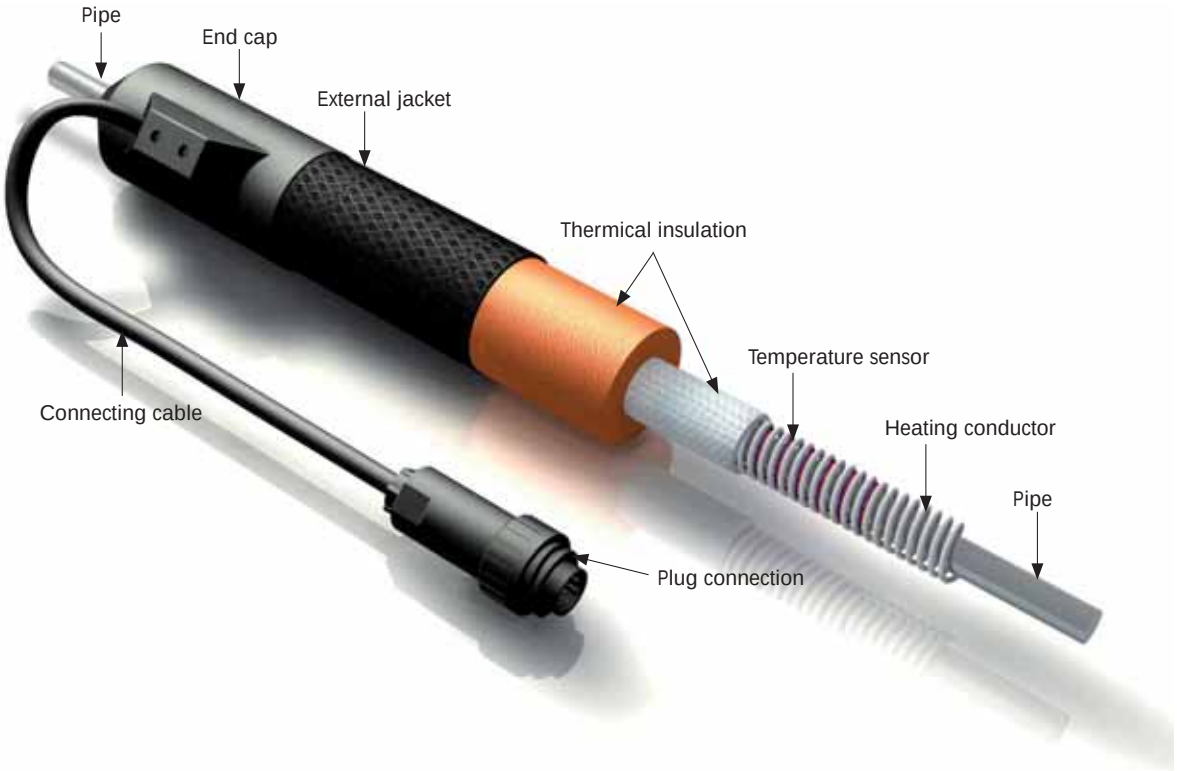
Applications:
Filters, valves, measuring gass distributor, cold zones and tanks

Heated pipe systems are manufactured in consultation with the user and are specifically attuned or supplied for the particular application. Pre-formed pipes can be furnished.

They are heated and insulated as straight pipe systems or in various shapes. Through a multitude of heating conductor materials in stock, the pipes can be optimally adjusted to the various operating temperatures, which extend from frost protection to 900°C. Optimal outside protection rounds out the system.

Operating temperature:	max. 900°C
Rated voltage:	230 V AC / DC (other voltage 12 - 500 V)
Rated power:	per design
Pipe materials:	Metal, glass, quartz, plastic etc.
End cap:	PA- hard cap or elastomer cap
Built-on accessories:	Heated, thermally insulated with external jacket
Temperature sensor:	Fe-CuNi type J, NiCr-Ni Typ K, PT100 and integral control system (HTI) are possible
Connecting cable:	1.5 m
Plug connection:	see schedule page 84

Temperature control using our control equipment, as listed in chapter 6 Temperature Controllers.



Series HE 90 °C

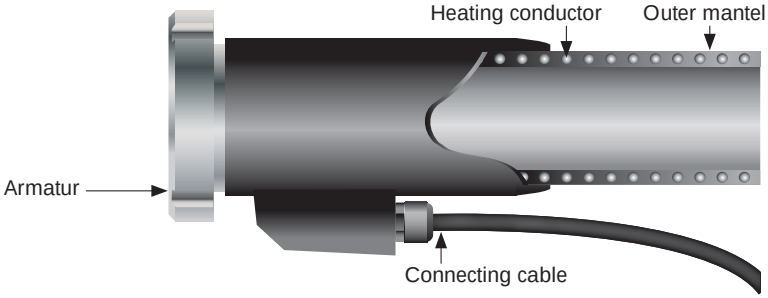
Transfer/unload hose

HE heating hose has been especially developed to maintain the temperature of the most diverse types of media, such as chemicals, solvents, oils, greases, and even abrasive materials. For example, this heated hose can be used for loading and unloading lorries and ships.

The peculiarity of this HE type heating hose is its heating element, which is coiled around its inner core. There it is well protected and vulcanised into the hose's inner wall. There is practically no optical or usage difference between this hose and a hose without heating capabilities, thus handling is simplified considerably. A temperature sensor is also integrated into the hose which senses temperature directly.

Operating temperature:	max. 90 °C
Rated voltage:	230 V AC/DC (other voltage 12 – 500 V)
Rated power:	per design
Nennweite:	20 to 200 mm
Contruction:	Elastomer core, torsion and pressure-proof fabric carcass, inside smooth, outside smooth textile patterned
Outer mantel:	abrasion resistant, weather resistant; Optional: steel spring spiral / suction hose
Farbe Außendecke:	black
Fitting:	Steel fittimg vulcan ised bubble free
Couplings / fittings:	flanges, Couplings: Storz, TW, Kamlok, outside threads Custom fittings: on request
Temperature sensor:	integrated heating conductor with PT 100 sensor
Connecting cable:	1,5 m
Reinigung:	Short-duration steam cleaning up to 130°C suitable for CiP and convertional cleaning
Manufacturing length:	up to max. 40 m
Protection grade:	IP 54 (EN 60529)
Protection class:	I

Special hoses made of fluoro-polymer (Viton) can be fabricated for higher temperatures up to 200 °C.
A range of temperature control devices is available, ranging from the HT 54 integrated mini-controller with fixed temperature setting to convenient microprocessor controlled devices. See chapter 6 Temperature Controllers.



Series HL 40 / 80 — 80 °C

Compact foodstuffs hose with integrated heating and optional electronic control

The Series HL foodstuffs hose is another innovation and stands out because of its compact build. The heating element is wound onto the inner liner of the NBR hose and is thus vulcanised in the inner core. There is practically no more difference to an unheated hose either optically or in technical application terms. The temperature sensor is also worked into the hose and captures the temperature directly at the hose wall. This universal hose is suitable to transport fatty (especially animal and vegetable fats & oils) and non-fatty foodstuffs. Also suitable to carry alcoholic and non-alcoholic beverages and fruit juices.

Operating temperature:	max. 80°C
Rated voltage:	230 V AC / DC (other voltage 12 - 500 V)
Rated power:	see schedule
Constrution:	Clear NBR inner liner, torsion and pressure-proof fabric carcass, inside smooth, outside smooth textile patterned
Outer mantel:	non-scratch, weather-resistant
Colour outer mantel:	blue
Fittings:	Stainless steel fittings of 1.4301 vulcanised bubble-free, Milk tube union / RD
Fittings options:	Conical hose connector / groove nut, threaded hose connector, optional flange (aseptic…), Clamp
Temperature sensor:	integrated heating conductor with PT 100 sensor
Connecting cable:	1.5 m
Cleaning:	Short-duration steam cleaning up to 130°C suitable for CiP and convertional cleaning
Protection grade:	IP 54 (EN 60529)
Protection class:	I

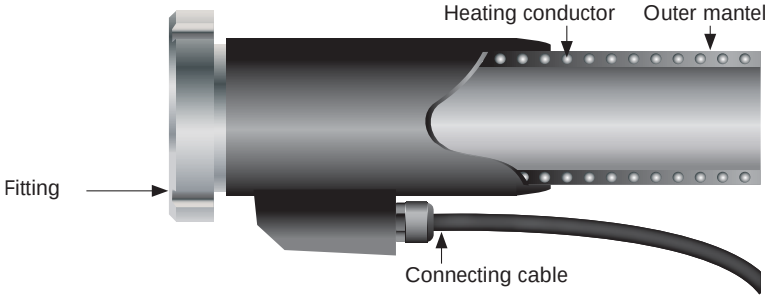
All hose materials used meet the requirements of the German Institute for Consumer Health Protection “Empfehlung XXI Kat. 2“ by BGVV(D) and FDA Part 177.2600

On request, we can also supply suction and pressure hoses with steel coil. For higher temperatures, we can also make fluorpolymer (Viton) hoses. Connectors with flanges, rapid-action couplings or exterior threads also available on request.

A range of temperature control devices is available, ranging from the HT 54 integrated mini-controller with fixed temperature setting to convenient microprocessor controlled devices. See chapter 6 Temperature Controllers.

Armatur (RD)	DN (mm)	Wand (mm)	BD (bar)	Bending radius ca. (mm)
44 x 1/6“	20	6	10	150
52 x 1/6“	25	6	10	175
58 x 1/6“	32	6	10	224
65 x 1/6“	40	7	10	280
78 x 1/6“	50	7	10	350
95 x 1/6“	65	7	10	455
110 x 1/4“	80	8	10	560
130 x 1/4“	100	8	10	700

max. Length (m)	Power up 40 °C (W/m)	Power up 80 °C (W/m)
40	30	50
40	40	60
40	50	75
40	60	90
40	75	120
40	90	150
40	110	200
40	140	250



Series HW 19/25 60 °C

Heated water-hose

Water supply and drainage in winter or cold environments.

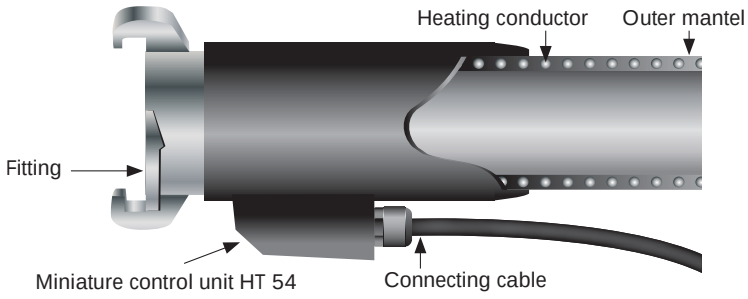
Applications:
Living and working containers, site installations, mining operations, refugee camps, military operations, stalls and caravans used by traders at Christmas fairs, mining industry, Catering.

The special, flexible heating conductor was wound onto the inner liner of the NR/SBR hose and is vulcanised into the core. There is practically no more difference to an unheated hose. Electrical energy is fed in only at the connector head by means of a cable. The temperature sensor is also integrated into the connector head so that the temperature can be maintained above freezing point or the water heated up to 60°C.

Operating temperature:	from –30 to +60°C
Rated voltage:	230 V AC / DC (other voltage 12 - 500 V)
Rated power:	see schedule
Inner core:	Industrial quality NR /SBR, optionally potable water quality BT-KW Cat. C (DVGW W270)
Construtión:	inside smooth, outside smooth textile patterned
Outer mantel:	non-scratch, weather-resistant
Colour outer mantel:	blue
Fittings:	19 mm GEKA – plus 3/4“ in MS 25 mm GEKA – plus 1“ in MS
Maximum pressure:	6 bar (bursting pressure:12 bar)
Bending radius:	250 mm
Dimensions:	Inner diameter 19 or 25 mm Wall thickness approx. 6 mm
Weight:	19 mm approx. 800 g/m, 25 mm approx. 1000 g/m
Connecting cable:	H07-RN-F 3 x 0.75 mm2, L = 3.0 m
Controller:	Micro-controller, setting +10°C PT 100 2-wire
Protection grade:	IP 64 (EN 60529)
Protection class:	I

HW19		
Metre	**Watt**	**Order Number**
10,0	200	HW-19/10
20,0	400	HW-19/20
40,0	800	HW-19/40

HW25		
Metre	**Watt**	**Order Number**
10,0	300	HW-25/10
20,0	600	HW-25/20
40,0	1000	HW-25/40



Series H 300 — 600 °C

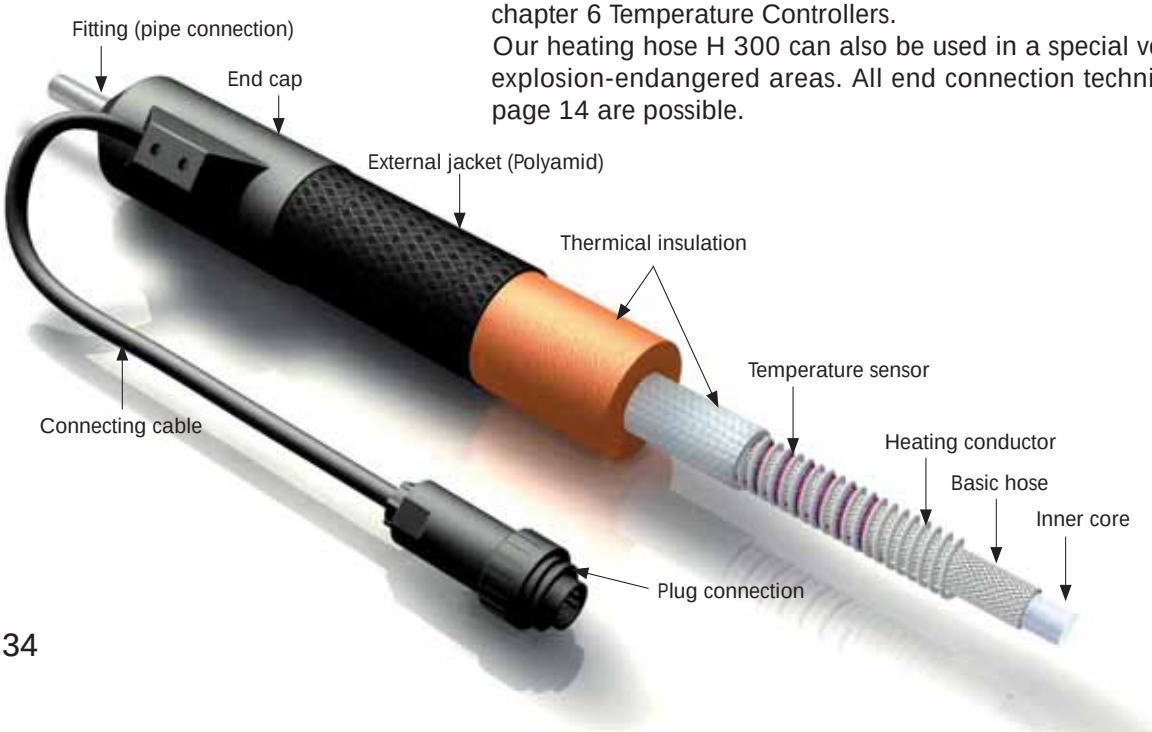
Analytical heating hose with RSL fitting and PTFE basic hose

Applications:
Maintaining the temperature of engine exhaust gases, CO_2 measurements, industrial waste gases, blast furnace waste gases, air measurements, environmental measurements, etc.
This heated sampling pipe prevents condensate from being discharged or the temperature from dropping below the dew point, so that no gas components are discharged or lost.

Operating temperature:	100°C / 200°C / 250°C / 450°C / 600°C
Rated voltage:	230 V AC / DC (other voltage 12 - 500 V)
Rated power:	Watts / metre see page 4
Basic hose:	up to 250 °C PTFE or PFA- core over 250 °C stainless steel – core, see page 15
Fittings:	RSL 1.4571 steel, for cutting ring screw union, without transition
Heating:	heating conducter, according DIN, moisture protected, with safety braid, > 250°C not moisture protected
Thermical insulation:	according to installation temperature, heat stabilised, closed pore silicone foam, respectively felt, elastomer foam
External jacket:	Polyamid black, options page 9
End cap:	PA- hard cap or elastomer cap
Temperature sensor:	Fe-CuNi type J, NiCr-Ni Typ K, PT100 and integral control system (HTI) are possible
Connecting cable:	3 m
Plug connection:	see schedule page 84
Manufacturing length:	up to 100 m
Protection grade:	IP 54 (EN 60529)
Protection class:	I

Tolerances:	
Operating temperature:	±10°C

Temperature control using our control equipment, as listed in chapter 6 Temperature Controllers.
Our heating hose H 300 can also be used in a special version in explosion-endangered areas. All end connection techniques on page 14 are possible.



Series H 300 A 600 °C

Analytical heating hose with exchangeable inner cores, which protrude at the ends

Applications:
Maintaining the temperature of probe lines for engine exhaust gases, CO_2 measurements, industrial waste gases, blast furnace waste gases, air measurements, etc.
The core of this heating hose continues without interruption or restriction from the discharge point up to analysis. The heavy-gauge conduit thread cable glands fitted at both ends simplify assembly. This design permits quick on-site replacement of the inner core when inside walls are contaminated.

Operating temperature:	100°C / 200°C / 250°C / 450°C / 600°C
Rated voltage:	230 V AC / DC (other voltage 12 - 500 V)
Rated power:	Watts / metre see page 4
Inner core:	up to 250 °C PTFE or PFA- core over 250 °C stainless steel – core, see page 15 Core 100 mm protruding, without transition
Heating:	heating conducter, according DIN, moisture protected, with safety braid, > 250°C not moisture protected
Thermical insulation:	according to installation temperature, heat stabilised, closed pore silicone foam, respectively felt, elastomer foam
External jacket:	Polyamid black, options page 9
End cap:	Cable screw fitting, bore hole Ø 42 mm DN 4 – 6 bore hole Ø 52 mm DN 8 – 12 bore hole Ø 65 mm DN 16 bore hole
Temperature sensor:	Fe-CuNi type J, NiCr-Ni Typ K, PT100 and integral control system (HTI) are possible
Connecting cable:	3 m
Plug connection:	see schedule page 84
Manufacturing length:	up to 50 m
Protection class:	I

Tolerances:	
Operating temperature:	±10°C

Temperature control using our control equipment, as listed in chapter 6 Temperature Controllers.
Through special features, additional applications are possible.
Diffusion proof when specially requested.

Series H 300 B Ex 180 °C

Automatically limiting analytical heating hose with firm PTFE inner core available in reels or by the metre

For self-assembly:
The H 300 B heating hoses can be supplied by the metre in lengths up to 150 m, so that customer can specify the lengths of his heating hose “from the reel“ and can fit the end connections in situ using our H 300 B-K assembly set. Parallel heating tapes are used for heating purposes.
For explosion-endangered areas, the heating hose can be supplied with explosion protection EExd IIC T 6 respectively T 5 up to 65°C, and as T 3 ATEX permit EExe II T 3 / T 5 / T 6 (Plex connections) up to 120°C.

Heating conductor
for assembly in H 300 B:

HKSI 70 Ni., p. 48

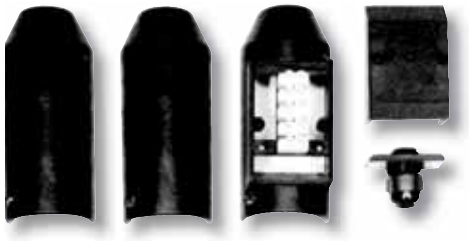
HKSP 20, p. 49

HKSI 40, p. 49

HBRC, p. 50

HBR, p. 50

Operating temperature according to choice of heating tapes:	max. 65°C, 120°C, 180°C Technical data, HSKI 70 Ni, HKSP 20, HKSI 40, HBRC, HBR
Rated voltage:	230 V AC (other voltage 12 - 500 V)
Inner core:	PFA- or PTFE core, see page 15
Fitting:	core 100 mm protruding, without transition
Thermal insulation:	heat stabilised, closed pore foam, respectively felt
External protection:	Polyamide 6-ring corrugated hose, flame-resistant, halogen-free,temperature -40°C to +120°C, briefly +150°C
End cap:	PA- hard cap or elastomer cap
Temperature sensor:	at HKSI sensor Fe-CuNi or PT 100
Outer diameter:	42 mm, ±10%
Manufacturing grade:	up to 150 m
Protection grade:	IP 54 (EN 60529)
Protection class:	I



Assembly kit H 300 B-K

The heating hoses with semi-conductor heating tapes HBR reduce their power at heating. The reached temperature depends on the ambient terms. Depending upon application a temperature controller is necessary, because the semi-conductor-coating can damaged. Where temperature differences arise on sections of installed heating hoses, the heating capacity adapts to the ambient temperature section by section. Accordingly, this ensures uniform heating overall.

Series H 300 C 250 °C

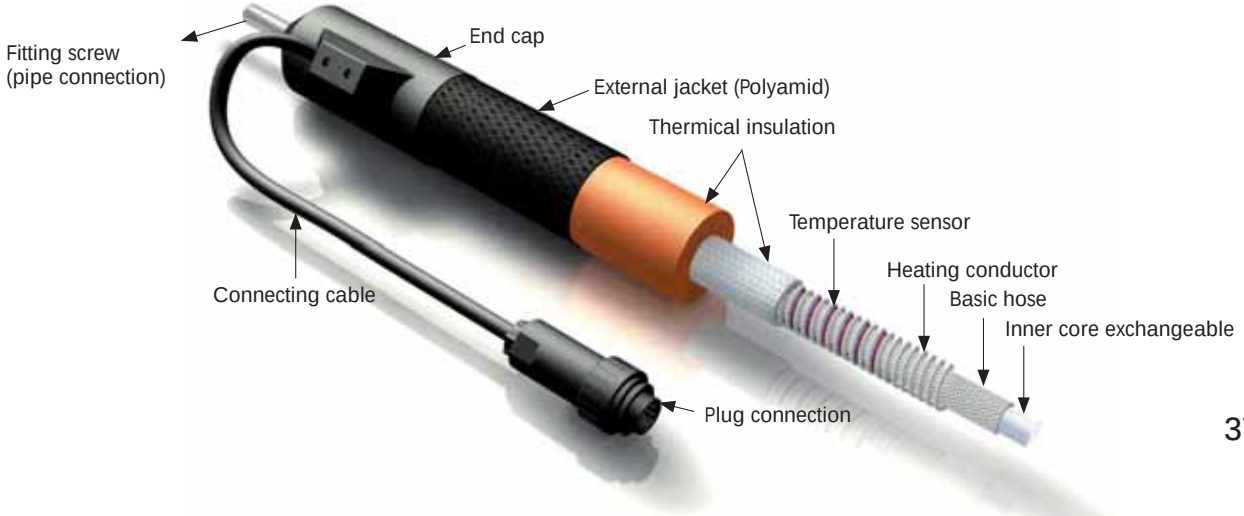
Analytical heating hose with replaceable inner cores and screw fitting

Applications:
Maintaining the temperature of probe lines for engine exhaust gases, CO_2 measurements, industrial waste gases, blast furnace waste gases, air measurements, etc.
The special fittings of 1.4571 steel prevents migration and buckling of the PTFE core at the ends of the analytical heating hose. A cutting ring screw union can be fitted. The external braiding provides tension relief.

Operating temperature:	max. 100°C, 200°C, 250°C
Rated voltage:	230 V AC / DC (other voltage 12 - 500 V)
Rated power:	Watts / metre see page 4
Inner core:	PFA- or PTFE – core, see page 15
Fittings:	RSL special fitting, 1.4571 stainless steel, without transition
Heating:	heating conducter, according DIN, moisture protected, with safety braid
Thermical insulation:	heat stabilised, closed pore silicone foam, respectively felt or elastomer foam (100°C)
External jacket:	Polyamid black, options page 9
End cap:	PA- hard cap or elastomer cap
Temperature sensor:	Fe-CuNi type J, NiCr-Ni Typ K, PT100 and integral control system (HTI) are possible
Connecting cable:	3 m
Plug connection:	see schedule page 84
Manufacturing length:	up to 100 m
Protection grade:	IP 54 (EN 60529)
Protection class:	I

Tolerances:	
Operating temperature:	±10°C

Temperature control using our control equipment, as listed in chapter 6 Temperature Controllers.
Our heating hose H 300 C can also be used in a special version in explosion-endangered areas. All end connection techniques on page 14 are possible.



Series HAF 200 °C

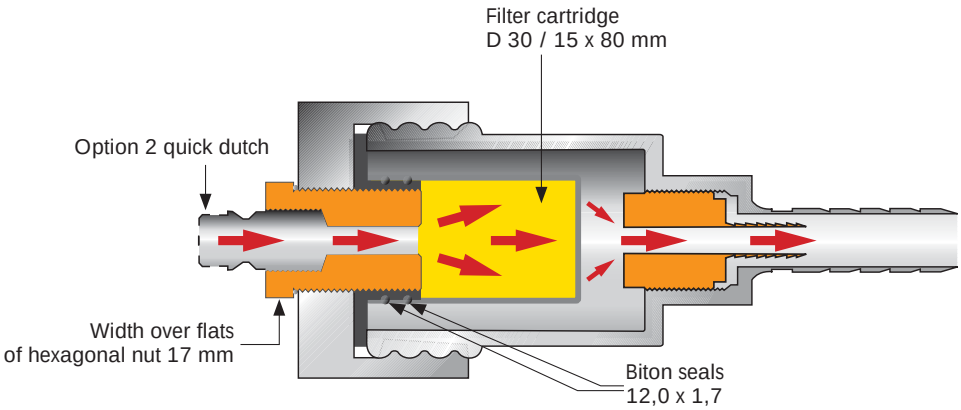
Heating hose with integrated filter

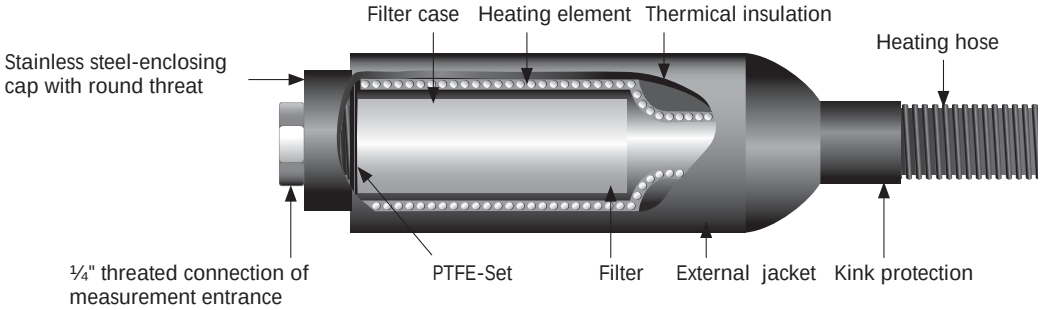
Analytical heating hose systems with integrated filter are a further development of the previously separate systems, heated hose and heated filter section. This version has been designed primarily for use with portable measuring equipment. For this purpose, special attention has been placed on a light and flexible design. The version shown is designed for this application.

Specification HAF
Test gas pipes (PTFE core DN 02 / DN 04) and control pipes can be fitted as options in this system. The filter housing consists of 1.4571 steel. Versions in Hasteloy or with PTFE coating are also possible. The heating hoses can be connected to all our governor types. Our integral system HTI is preferred. Temperature recording for all other control systems takes place on the filter housing.
For general, use the filter housing can be adapted to other filter dimensions, other hose nominal widths and hose lengths, so that this new development can be adjusted to all existing analytical heating hose systems and covers the complete range of analytical technology.
Temperature control using our control equipment, as listed in chapter 6 Temperature Controllers.

Inner core PTFE:

NW	fixed	exchangeable
8	X	
4	X	X





Series HMI 200 °C

Mini heating hose

Applications:
Heating hoses for Gluetechnology within a control cabinet; flexible connection components between and in machines or plant; in analytical technology for portable measuring systems; connection hoses in medical technology for all applications; in metering systems to maintain the heat of a medium.
HMI mini heating hoses are miniaturized versions of our standard H100 and H200 hose series. Their structure is similar to standard hoses, only less thermal insulation is used.

Operating temperature:	max.200°C
Rated power:	individually adaptable
Application voltage:	extra low and mains voltage
Rated hose type:	PTFE-cores, Silicone-Viton hoses, ca. pillary of high grade steel and copper, plastic hoses made of PA/PP/PE/PVC/...
Outerl diameter:	min. 20 mm possible
Application voltage:	extra low and mains voltage
Available models:	self-limiting, with fitted (customer specific) sensor, with connection to integral governor HTI

The external sheath consists of a SI tube, reddish brown/ black, or an enclosed PA-corrugated tube according to the application.
The connections used consist of shaped silicone components, shrink-fit caps and tapered or cast shapes.

SMI 150 °C

Clip-style tracer heating

This tracer heating for thin steel and copper pipes consists of a silicone profile with two parallel worked-in heating conductors. The slotted shape enables pipes to be heated in pre-assembled piping systems - for example, in analytical cabinets - without these having to be dismantled for heating. This saves considerable assembly costs.
The version available at the moment covers piping from 6 - 10 mm (outer diameter). The lengths and outputs are flexibly adapted to customer request.

Heated sleeve 200 °C

If you have an unheated fitting and need to keep your medium at the right temperature, then our HIH heating sleeve is the right solution.

Applications:
Interconnection of heating hoses, connection of the heating hose to the system, feeders in the heating hose system, as an adapter between different fittings.

Heating sleeve HIH

Operating temperature:	max. 200°C
Rated voltage:	230 V AC / DC (other voltage 12 - 500 V)
Rated power:	sleeve Ø 22 mm = 12 W sleeve Ø 40 mm = 24 W

The capacity is designed so that for heating hoses that are set at operating temperatures of up to 200°C, the temperature does not drop in the connector component. For this reason, in the majority of cases HIH does not need any control, although it can be fitted with one if required.

Typ	inner diameter	heated length	total length
HIH – 08	22 mm	70 mm	96 mm
HIH – 16	40 mm	90 mm	120 mm

For special applications, the sleeves can be provided with knock-outs. These permit the production of special feeder types.

Isolating sleeve without heating HI

Typ	Temperature:	Inside/length:	total length
HI – 08	200 °C	22 mm	70 mm
HI – 16	200 °C	40 mm	90 mm

with loop fastening

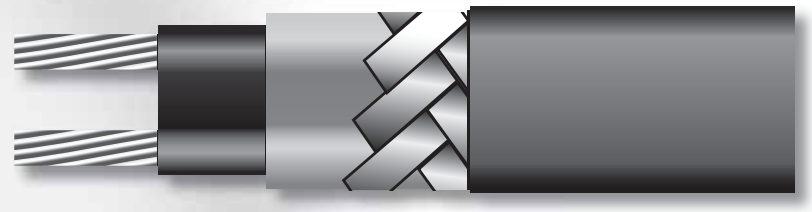
Hot-Box

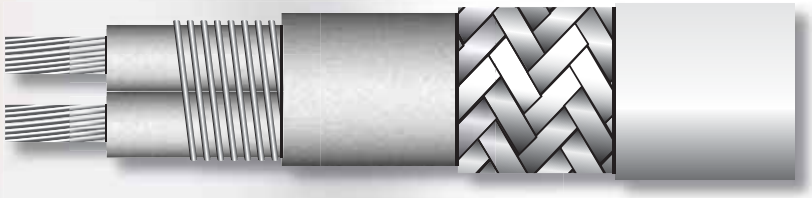
Housing with integrated heater for loss-free connection to analysis lines made with robust metal casing.

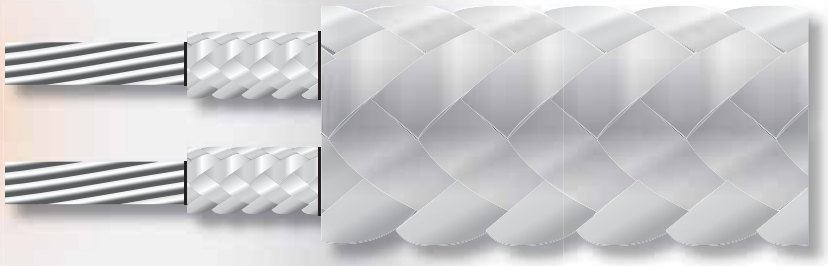
Operating temperature:	max. 250 °C
Rated voltage:	230 V AC/DC (other voltage 12 – 500 V)
Rated power:	will be adapted to design requirements
Dimensions:	will be adapted to design requirements
Isolation:	12 mm of elastomerfoam
Temperature sensor:	selective
Connecting cable:	3 m
Temperature controller:	see Chapter 6 Temperature Controllers

hillesheim

Flexible Tracer Heaters







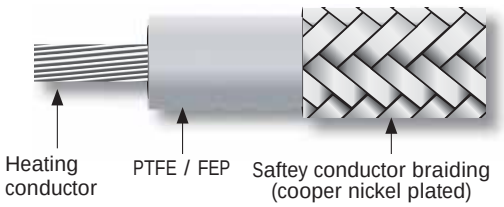
Type HST 250 °C

Moisture-proof heating cords

The HST is a PTFE insulated, inexpensive heating cord for heating small diameter pipes, surfaces, etc.
The connecting cables are PTFE insulated.
The cord is moisture-proof and has a safety conductor.

Operating temperature:	max. 250°C (integrally controlled) HTI
Rated voltage:	230 V AC/DC (special voltage are possible)
Min. bending radius:	10 mm
Connecting cable:	1.5 m power supply on both ends
Diameter:	Ø 2.5 - 3.5 mm
Protection grade:	IP 54 (EN 60529)
Safety conductor braiding:	Cooper nickel plated, moisture-proof
Protection class:	I

With a spacer tape, the heating cable can be fixed in place for surfaces and for cylindrical heating.
Temperature control using our integral thermostat HTI, as listed in chapter 6 Temperature Controllers. The HTI version is controllable without sensor.



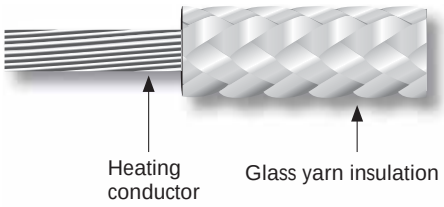
Metres	Watt	Order Nr.
4,5	125	HST/045
5,5	135	HST/055
6,0	125	HST/060
8,0	220	HST/080
9,0	195	HST/090
12,0	275	HST/120
14,0	235	HST/140
14,0	360	HST/141
15,0	335	HST/150
16,0	315	HST/160
17,0	300	HST/170
20,0	510	HST/200
30,0	700	HST/300
35,0	600	HST/350
38,0	1000	HST/380
42,0	900	HST/420
48,0	790	HST/480
50,0	1200	HST/500
58,0	1400	HST/580

In addition to the listed lengths, larger and intermediate lengths can also be supplied.

Type HS 450 °C

Heating cord with tight winding radii

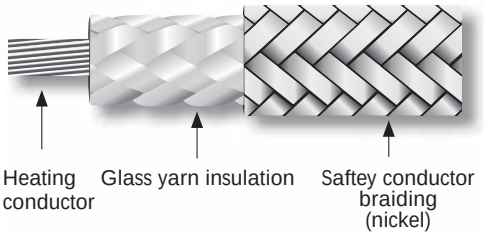
Glass filament insulated heating cord. Very flexible, especially suitable for tight winding radii and concentrated power.
The connecting cables are glass fibre insulated.



Operating temperature:	max. 450°C
Rated voltage:	230 V AC/DC
Min. bending radius:	4 mm
Connecting cable:	1.5 m on both ends
Diameter:	Ø 3 - 4 mm
Degree of protection:	IP 20 (EN 60529)
Safety conductor braiding:	no / not moisture proof
Protection class:	0

Type HSS 450 °C

with additional conductor wire sheathing.
Construction is equivalent to Type HS



Operating temperature:	max. 450°C
Rated voltage:	230 V AC/DC
Min. bending radius:	6 mm
Connecting cable:	1.5 m on both ends
Diameter:	Ø 3.5 – 4.5 mm
Degree of protection:	IP 20 (EN 60529)
Safety conductor braiding:	nickel, not moisture-proof
Protection class:	I

Metres	Watt	Order Nr.	
0,6	75	HS/006	HSS/006
1,0	100	HS/010	HSS/010
2,0	250	HS/020	HSS/020
3,0	350	HS/030	HSS/030
4,0	500	HS/040	HSS/040
5,0	600	HS/050	HSS/050
6,0	800	HS/060	HSS/060
8,0	1000	HS/080	–
10,0	1250	HS/100	HSS/100
15,0	1500	HS/150	–

In addition to the listed lengths, larger lengths and capacities as well as intermediate lengths can also be supplied. Where required, please state the length and power of the heating cord.

Temperature control using our control equipment, as listed in chapter 6 Temperature Controllers.

Type HSQ 900 °C

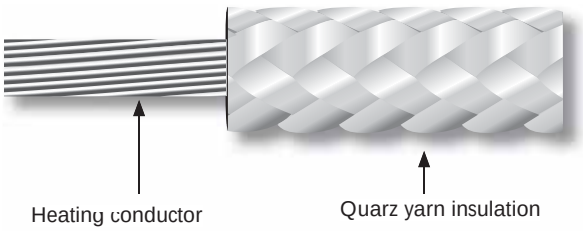
High temperature heating cord

Quartz glass insulated heating cord for high temperatures. Very flexible, especially suitable for tight winding radii and concentrated power.
The connecting cables are glass fibre insulated.
This heating cord has no safety earth and is not moisture-proof.

Operating temperature:	max. 900°C
Rated voltage:	230 V AC/DC
Min. bending radius:	12 mm
Connecting cable:	1.5 m on both ends
Diameter:	Ø 3.5 – 4.5 mm
Degree of protection:	IP 20 (EN 60529)
Safety conductor braiding:	no, not moisture-proof
Protection class:	0

Metres	Watt	Order Nr.
1,0	170	HSQ/10
2,1	370	HSQ/21
3,0	500	HSQ/30
4,0	700	HSQ/40
5,0	850	HSQ/50
6,0	1000	HSQ/60

In addition to the listed lengths, larger lengths and capacities as well as intermediate lengths can also be supplied. Where required, please state the length and power of the heating cord.



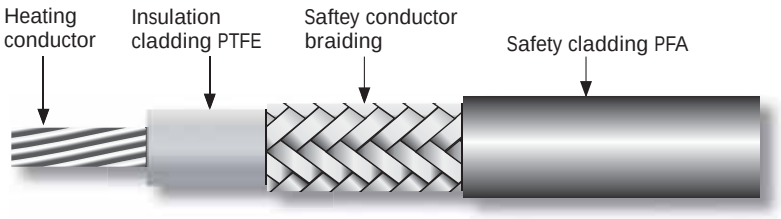
Type EKL ⟨Ex⟩ 200 °C

Single-wire heating cord

EKL for the ⟨Ex⟩-area
The EKL single-wire PFA heating cord is a very flexible, fixed-resistance heating cord. So it can be used simply and effortlessly to heat pipes, pumps, valves or containers. It offers constant output per metre and ensures easy assembly even at low ambient temperatures, so it can be finished without problems on the construction site.
It is highly mechanically and chemically resistant and is steam rinse-proof.

Operating temperature:	max. 200°C
Rated voltage:	300/500 V AC
Test voltage:	AC 2.2 kV
Min. bending radius:	30 mm
Connecting cable:	up to 4 mm²
Min. laying temperature:	-20°C
Mechan. strength:	4 joules per EN 50019
Safety conductor braiding:	< 18.2 Ohm/km
Weight:	< 160 g/m
External diameter:	Ø 3.5 – 4.5 mm
Degree of protection / class:	IP 20 (EN 60529) / I

Explosion protection	
Marking:	Ex II 2G EEx e II
Test certificate:	LCIE 05 ATEX 6086 U



EKL-E	**EKL-G**

The coupler meets the explosion protection requirements for electrical systems of device group II and device categories 2G and 2D. It serves to create an electrical connection between single-wire EKL heating cords (page 21). The permissible holding temperature range is max. +170°C (depending on the power loading)

Marking:	⟨Ex⟩ II 2G EEx e II T6 to T3 ⟨Ex⟩ II 2D IP 65 TX
Test certificate:	IBExU04 ATEX 1157 X
Rated voltage:	550 V
Nominal current:	max. 20 A
Ambient temperature range:	-32°C to +200°C
Dimensions:	Ø 25 mm, L approx. 115 mm
Connecting cable:	EKLK 2,5 mm², EKLK 4 mm²
Protection grade / class:	IP 65 (EN60529) / I

Selection table Tolerances -5% / +10%	
Short name	**Ohm/km at +20°C**
EKL 04R4	4,40
EKL 0010	10,00
EKL 11R7	11,70
EKL 0025	25,00
EKL 31R5	31,50
EKL 0050	50
EKL 0100	100
EKL 0180	180
EKL 0250	250
EKL 0280	280
EKL 0360	360
EKL 0450	450
EKL 0650	650
EKL 0800	800
EKL 1000	1000
EKL 1300	1300
EKL 1470	1470
EKL 1900	1900
EKL 2900	2900
EKL 4000	4000
EKL 8000	8000

Heating tape preparation Accessories

For parallell and self-limiting heating tapes

Ex works assembly	Self-assembly set
KFE-80	KF-80

For heating tapes: HBRC and HKSP up to max. 90°C; assembly with 1.5 m connection cable; (shrink fit technology)

KFE-90	KF-90

For heating tapes: HBRC and HKSP up to max. 90°C; assembly for direct connection; (shrink fit technology)

KFE-120	KF-120

For heating tapes: HBRT up to 120°C (max. 180°C); assembly with 1.5 m connection cable; (shrink fit technology)

KFE-180	KF-180

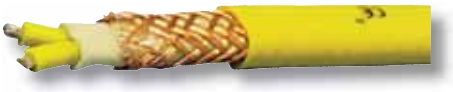
For heating tapes: HKSI up to 180°C (max. 200°C); assembly with 1.5 m connection cable; (Silicone adhesion technology)

KFE-190	KF-190

For heating tapes: HKSI up to 180°C (max. 200°C); assembly for direct connection; (Silicone adhesion technology)

Heating conductor:

HKSI 70 Ni., S. 48



HKSP 20, S. 49

HKSI 40, S. 49

HBRC, S. 50

HBR, S. 50

Plexo connector system

Ex-connection system for PSB and HSB heating tapes

Plexo is the first pluggable connector system for heating tapes in explosion-hazard zones.
Application with HBR-PSB/HSB self-delimiting parallel heating tapes (page 50).
The connection is made up of a plug and a socket section, and for heating tapes and connecting cord strands is by means of spring terminals. Their spring strength creates the pressure for contacting the protective sheath, so no laborious splicing and twisting is necessary. A clever sealing system offers secure protection against extreme environmental influences.
The system's flexibility permits direct connection of heating tapes with the connecting cord or connection to an explosion-proof terminal box. Special couplers are available to connect 2 identical heating tapes.

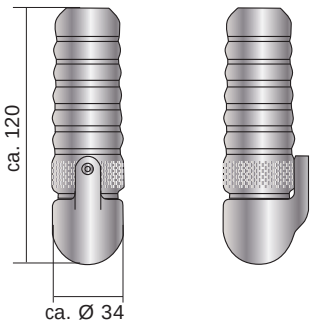
Plexo with PSB heating tape	
Operating temperature:	max. 65°C
Marking:	Ex II 2G EEx e II T 6 / T 5
Test certificate:	KEMA 00 ATEX 2017
Ambient temp.:	minimum -30°C (heating on) maximum +65°C (heating on)
Max. short-time temp.:	+85°C (heating off)
Connecting voltage:	254 V AC
Overcurrent protection:	Characteristic C, max. 20 A
Connection (cross-section):	up to 4.0 mm²
Housing material:	High-temperature thermoplastic
Seal material:	EPDM elastomer
Protective system:	IP 66 / IP 68 (EN 60529)
Standards:	EN 50014; 50019, EG EMV 89/336/EWG EG Low- 73/23/EWG, Ex 94/9/EG
Laying temperature:	minimum -30°C

Plexo with HSB heating tape	
Operating temperature:	max. 120 °C
Marking:	Ex II 2G EEx e II T 3
Test certificate:	KEMA 00 ATEX 2018
Ambient temp.:	minimum -30°C (heating on) maximum +120°C (heating on)
Max. short-time temp.:	+180°C (heating off)
Connecting voltage:	254 VAC
Overcurrent protection:	Characteristic C, max. 20 A
Connection (cross-section):	up to 4.0 mm²
Housing material:	High-temperature thermoplastic
Seal material:	Silicone elastomer
Protective system:	IP 66 / IP 68 (EN 60529)
Standards:	as PSB

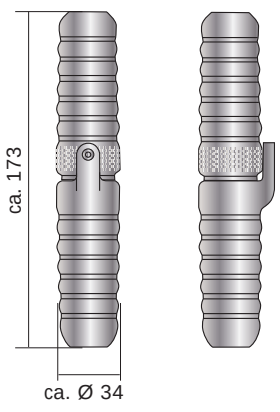
Silicone connection pipe	
3 x 1,5 SIHI	1,5
3 x 2,5 SIHI	2,5

- Contact the protective braiding with a handle
- A system for various heating cables
- Simple changeover to other tracer heating systems is possible
- Direct connection for armoured cables

Closing off



Connection / Extension



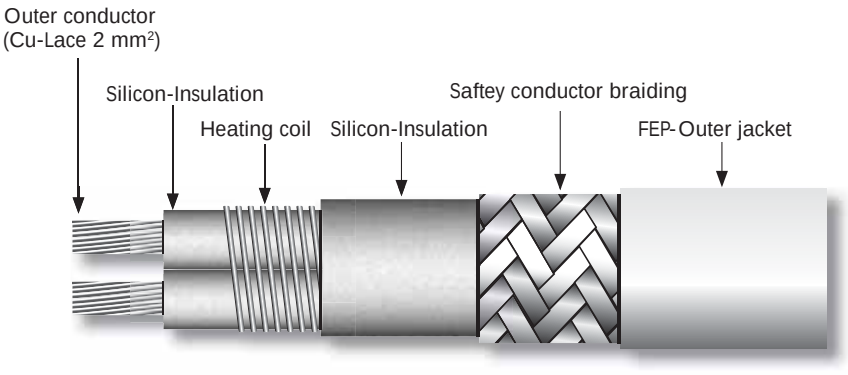
Type HKSI 70 Ni — 180 °C

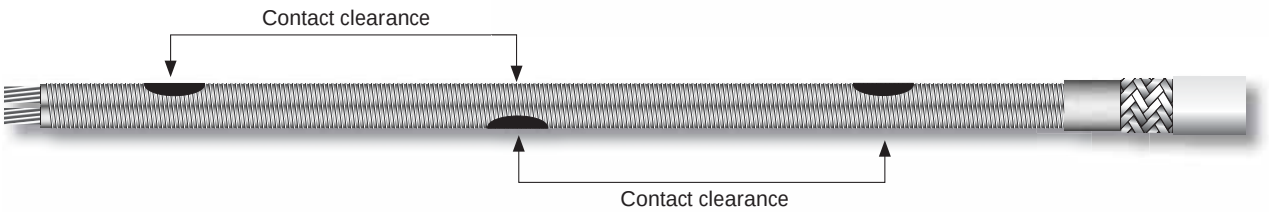
HighTechIntegral; HTI heating tape with the heating conductor as a sensor

On the HTI parallel heating tape, the complete length of the heating tape is used for temperature measurement and control (integral), with which we achieve uniform temperature measurements over the complete area.
Additional advantage: The parallel heating tape can be cut to size in situ and during fitment can be especially adapted to the installation that is to be heated.

Operating temperature:	180°C (integrally controlled)
Rated voltage:	max. 230 V AC/DC
Rated power:	70 W/m at 20°C
Surface temperature:	max. 200°C
Length of heating circuit:	max. 60 m
Contact clearance:	2 m
Min. bending radius:	50 mm
Outer dimensions:	app. 8 x 11 mm (oval)
Outer jacket:	FEP
Protection grade:	IP 65 (EN 60529)
Safety conductor braiding:	yes
Protection class:	I

Making up sets page 46
Temperature control using our integral thermostat HTI, as listed in chapter 6 Temperature Controllers.

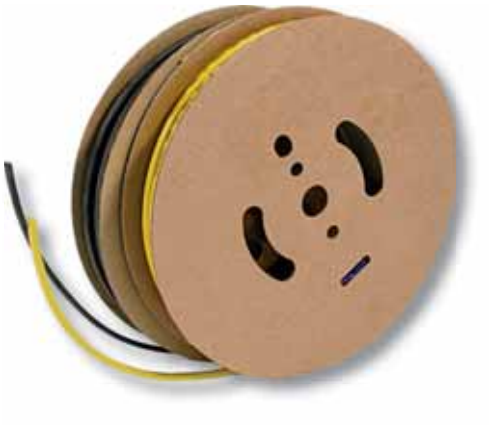




Type HKSP 20 — 60 °C
Type HKSI 40 — 150 °C

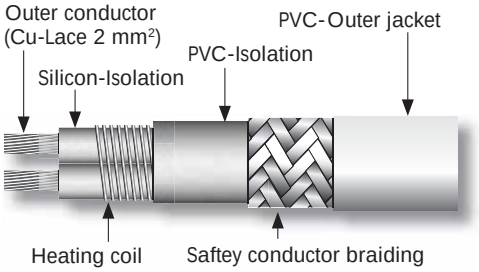
Parallel heating tape by the metre can be made up as required

Both the heating tapes HKSP and HKSI have been especially developed for heating industrial plant, gutters, pipes, tanks and similar applications in the open air and in moist rooms.
They can be supplied by the metre, so that the tape can be laid in situ as required and can be made ready for connection in way of the item with an additionally available making up set. On request, the quoted required length can be supplied made up ready for connection, ex works.
The heating tape is VDE approved.



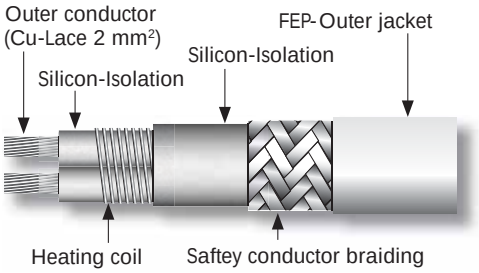
HKSP 20	
Operating temperature:	max. 60°C (controlled)
Rated voltage:	230 V AC/DC
Rated power:	app. 20 W/m
Surface temperature:	max. 90°C
Length of heating circuit:	max. 140 m
Contact clearance:	0.7 m
Min. bending radius:	50 mm
Outer dimensions:	app. 8 x 11 mm (oval)
Outer jacket:	PVC
Protection grade:	IP 65 (EN 60529)
Safety conductor braiding:	yes
Protection class:	I

Making up sets page 46



HKSI 40	
Operating temperature:	max. 150°C (controlled)
Rated voltage:	230 V AC/DC
Rated power:	app. 40 W/m
Surface temperature:	max. 200°C
Length of heating circuit:	max. 100 m
Contact clearance:	0.6 m
Min. bending radius:	50 mm
Outer dimensions:	app. 8 x 11 mm (oval)
Outer jacket:	FEP
Protection grade:	IP 65 (EN 60529)
Safety conductor braiding:	yes
Protection class:	I

Making up sets page 46



Type HBRC 65 °C
Type HBR Ex 120 °C

Self-limiting heating tapes (with and without Ex-approval)

The self-limiting heating tapes control their heating capacity according to the pertinent degree of heating, so that when the final temperature is achieved, it is kept constant. Where sectional temperature differences occur, the heating adapts from one section to the next. This ensures uniform heating. The tapes can be laid overlapping; this is especially suitable for uneven surfaces, such as those that can occur in way of pumps, valves and branches.
The HBRC and HBR heating tapes are available by the metre with matching finishing sets for individual length adjustment on site or pre-finished ex works. The heating tapes come in two variants: With and without -permit.

Heating tape without ex approval			
Order-Nr.	Watt/m bei +10 °C		max. length of heating circuit
HBRC 15	65 °C	15	140 m
HBRC 25	65 °C	25	80 m
HBR 40	120 °C	40	70 m
HBR 45	120 °C	45	60 m

Heating tape with ex approval			
Order-Nr.	Watt/m bei +10 °C		max. length of heating circuit
HBR-PSB 13	65 °C	13	180 m
HBR-PSB 26	65 °C	26	80 m
HBR-PSB 33	65 °C	33	70 m
HBR-HSB 45	120 °C	45	70 m

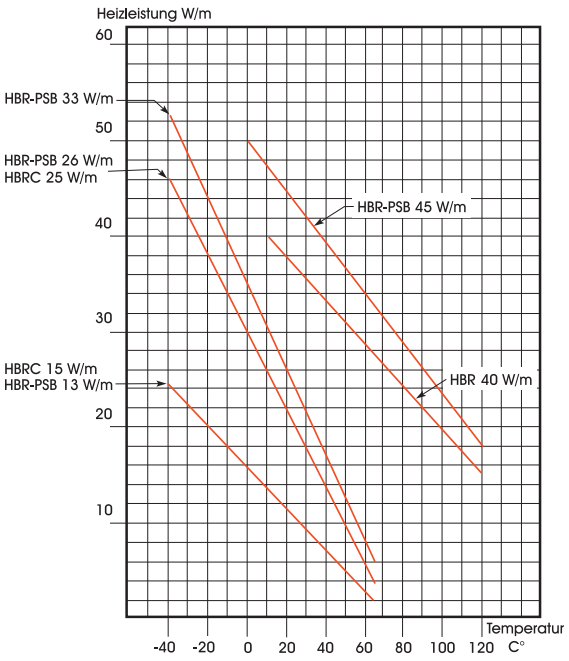
16 A closing temperature +10°C
Safety cutout (C)

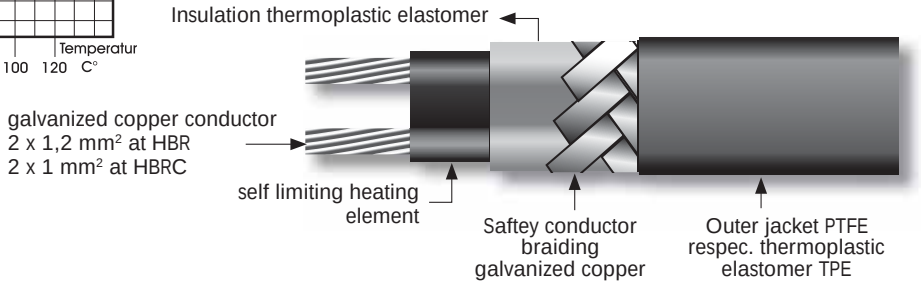
HBRC	
Operating temperature:	max. 65°C / off: 85°C
Rated voltage:	230 V AC
Rated power:	< 25 W/m
Min. bending radius:	25 mm
Outer dimensions:	app. 6 x 16 mm (thickness x width)
Outer jacket:	PTFE / TPE
Protection grade:	IP 65 (EN 60529)
Protection class:	I

Through temperature limitation to 65°C, this self-limiting heating tape is suitable for use on plastic pipes and tanks.

HBR	
Operating temperature:	max. 120°C / off: 190°C
Rated voltage:	230 V AC
Rated power:	< 45 W/m
Min. bending radius:	30 mm
Outer dimensions:	app. 5.5 x 15mm (thickness x width)
Outer jacket:	PTFE / TPE
Protection grade:	IP 65 (EN 60529)
Protection class:	I

Making up sets: page 46
Ex-connection Plexo: page 47





Type HSTD 250 °C

Narrow version heating tape

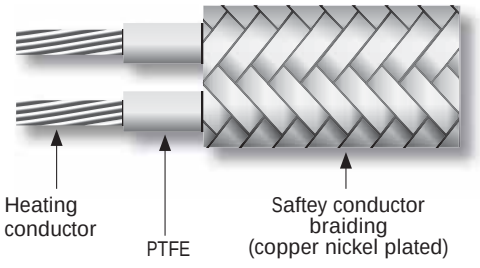
On this narrow heating tape, the PTFE insulated heating cable with earthed protective conductor is laid twice and sheathed with a common metal braiding.

Operating temperature:	max. 250°C
Rated voltage:	230 V AC/ DC (special voltage are possible)
Rated power:	app. 50 W/m
Min. bending radius:	10 mm
Outer dimensions:	app. 4 x 9 mm (thickness x width)
Outer jacket:	metallic braid
Connecting cable:	1 m
Safety conductor braiding:	Cooper nickel plated, moisture proof
Protection grade:	IP 65 (EN 60529)
Protection class:	I

Temperature control using our integral thermostat HTI, as listed in chapter 6 Temperature Controllers.
In HTI version controllable without additional sensor.

Metres	Watt	Order Nr.
0,5	30	HSTD/005
1,0	50	HSTD/010
1,5	90	HSTD/015
2,5	150	HSTD/025
4,0	220	HSTD/040
6,0	275	HSTD/060
8,0	400	HSTD/080
10,0	500	HSTD/100
15,0	700	HSTD/150
20,0	1100	HSTD/200

In addition to the listed lengths, larger and intermediate lengths are also available.



Type HSTDD 250 °C

Heating tape with metallic braid

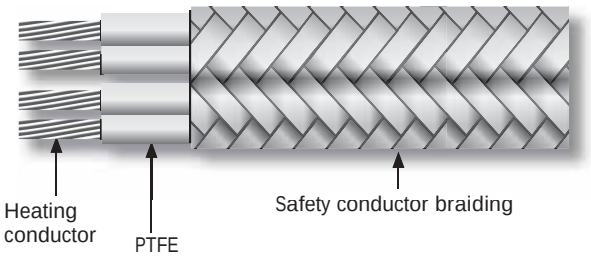
This heating strip combines a PTFE insulated heating cable having a parallel earth protective conductor – all jacketed together in a metal braid. This structure makes the heating strip very flexible and the outer metal braid ensures very good heat transfer to the pipe or container to be heated.

Operating temperature:	max. 250°C
Rated voltage:	230 V AC/ DC (special voltage are possible)
Rated power:	app. 100 W/m
Min. bending radius:	10 mm
Outer dimensions:	app. 4 x 20 mm (thickness x width)
Outer jacket:	metallic braid
Connecting cable:	1 m
Safety conductor braiding:	yes / protective earthing, moisture proof
Protection grade:	IP 54 (EN 60529)
Protection class:	I

Temperature control using our integral thermostat HTI, as listed in chapter 6 Temperature Controllers.
In HTI version controllable without additional sensor.

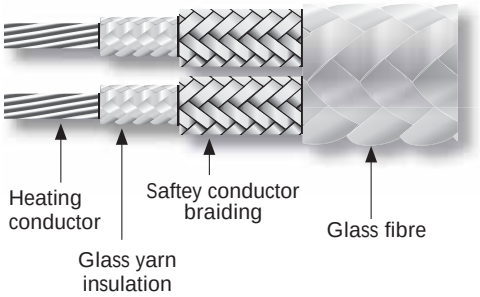
Metres	Watt	Order Nr.
0,5	60	HSTDD/005
1,0	100	HSTDD/010
1,5	180	HSTDD/015
2,5	300	HSTDD/025
4,0	420	HSTDD/040
6,0	550	HSTDD/060
8,0	800	HSTDD/080
10,0	1000	HSTDD/100
15,0	1400	HSTDD/150
20,0	2200	HSTDD/200

In addition to the listed lengths, larger and intermediate lengths are also available.

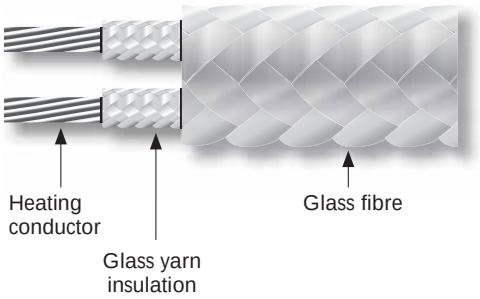


Type HBS 450 °C
Type HB 450 °C

Only suitable for a dry environment, safety earthed and very flexible design. Multiple glass filament insulation with additional protective conductor over the heating conductor. One-sided connection. For multifarious use in laboratories, technical colleges and industry. This version HB has no protective conductor. It is thus even thinner and smoother than the HBS series heating tapes.



HBS	
Operating temperature:	≥ 7.0 m max. 450°C ≥ 10.0 m max. 350 °C
Rated voltage:	230 V AC/ DC
Rated power:	app. 250 W/m
Min. bending radius:	10 mm
Outer dimensions:	5.5 x 30 mm (thickness x width)
Outer jacket:	glass fibre
Connecting cable:	0.5 m with connection box
Protection grade:	IP 20 (EN 60529)
safety conductor braiding:	nickel
Protection class:	I



HB	
Operating temperature:	≥ 7.0 m max. 450°C ≥ 10.0 m max. 350 °C
Rated voltage:	230 V AC/ DC
Rated power:	app. 250 W/m
Min. bending radius:	6 mm
Outer dimensions:	3.5 x 30 mm (thickness x width)
Outer jacket:	glass fibre
Connecting cable:	0.5 m with connection box
Protection grade:	IP 20 (EN 60529)
safety conductor braiding:	no
Protection class:	0

Metres	Watt	Order Nr.	
0,5	100	HBS/005	HB/005
1,0	250	HBS/010	HB/010
1,5	350	HBS/015	HB/015
2,0	500	HBS/020	HB/020
2,5	600	HBS/025	HB/025
3,0	750	HBS/030	HB/030
4,0	900	HBS/040	HB/040
5,0	1250	HBS/050	HB/050
7,0	1550	HBS/070	HB/070
10,0	2000	HBS/100	HB/100
15,0	3000	HBS/150	

Temperature control using our control equipment, as listed in chapter 6 Temperature Controllers.

Type HBQ 900 °C

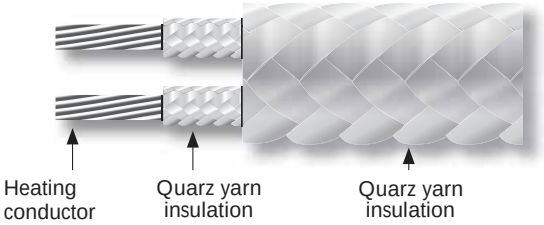
High temperature heating tape

Very flexible heating tape, with high temperature stability and high power concentration, not moisture-proof. Heating conductor incorporated in high temperature resistant quartz fabric, thus a flexible heating tape despite the high operational temperature.

Operating temperature:	max. 900°C
Rated voltage:	230 V AC/ DC
Rated power:	app. 350 W/m
Min. bending radius:	10 mm
Outer dimensions:	5 x 30 mm (thickness x width)
Outer jacket:	quartz fabric
Connecting cable:	1 m with connection box
Protection grade:	IP 20 (EN 60529)
Safety conductor braiding:	no, not moisture-proof
Protection class:	0

Metres	Watt	Order Nr.
0,5	180	HBQ/05
1,0	350	HBQ/10
1,5	500	HBQ/15
2,0	700	HBQ/20
2,5	850	HBQ/25
3,0	1000	HBQ/30

Temperature control using our control equipment, as listed in chapter 6 Temperature Controllers.



Type HIL-SS 800 °C

Heating cable with metal braiding stainless steel 1.4541

Application potential:
Submersible heaters, containers, valves, pumps, forms, process and plate heaters.
This mineral-insulated heating cable with a braiding of high grade steel 1.4541 is applicable within extreme corrosive and damp surroundings. The HIL heating cable is extremely robust and easy to bend. The stainless steel braiding is watertight, oiltight and gastight. A utilisation temperature of up to 800°C enables a variety of applications.
The cold end of the heating cable can be fed into a terminal box and connected by means of a M20X1.5 screwed connection.

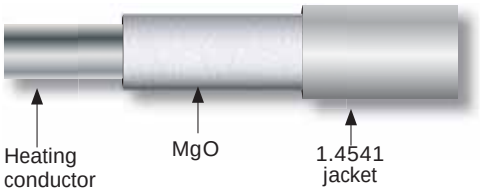
Metres	100 Watt/m	Order Nr.	AD Ø mm	Ohm/ Metres	Bending radius mm
7,2	720	HIL-SS/10007	3,2	10,0	> 12
9,1	910	HIL-SS/10009	3,2	6,3	> 12
11,5	1150	HIL-SS/10011	3,2	4,0	> 12
14,5	1460	HIL-SS/10014	3,6	2,5	> 15
18,0	1800	HIL-SS/10018	3,8	1,6	> 15
23,0	2300	HIL-SS/10023	4,1	1,0	> 20
29,0	2900	HIL-SS/10029	4,5	0,63	> 20
36,0	3600	HIL-SS/10036	5,0	0,4	> 30
46,0	4600	HIL-SS/10046	5,6	0,25	> 30
57,5	5750	HIL-SS/10057	6,5	0,16	> 30

Metres	200 Watt/m	Order Nr.	AD Ø mm	Ohm/ Metres	Bending radius mm
5,1	1020	HIL-SS/20005	3,2	10,0	> 12
6,5	1300	HIL-SS/20006	3,2	6,3	> 12
7,7	1540	HIL-SS/20008	3,2	4,0	> 12
10,3	2060	HIL-SS/20010	3,6	2,5	> 15
12,7	2540	HIL-SS/20012	3,8	1,6	> 15
15,5	3100	HIL-SS/20015	4,1	1,0	> 20
20,3	4060	HIL-SS/20020	4,5	0,63	> 20
25,5	5100	HIL-SS/20025	5,0	0,4	> 30
32,5	6500	HIL-SS/20032	5,6	0,25	> 30
40,0	8000	HIL-SS/20040	6,5	0,16	> 30

Metres	250 Watt/m	Order Nr.	AD Ø mm	Ohm/ Metres	Bending radius mm
4,6	1150	HIL-SS/25004	3,2	10,0	> 12
7,3	1800	HIL-SS/25007	3,2	4,0	> 12
9,2	2300	HIL-SS/25009	3,6	2,5	> 15
12,0	2870	HIL-SS/25012	3,8	1,6	>15
14,0	3500	HIL-SS/25014	4,1	1,0	> 20
18,0	4550	HIL-SS/25018	4,5	0,63	> 20
23,0	5750	HIL-SS/25023	5,0	0,40	> 30
29,0	7250	HIL-SS/25029	5,6	0,25	> 30

Operating temperature:	max. 800°C
Rated voltage:	230 V AC/DC
Rated capacity:	100 / 200 / 250 W/m
Outer jacket:	stainless steel 1.4541
Length of cold ends:	0.5 m
Protection class:	IP 67 (EN60529)
Protective conductor:	yes
Protection class:	I

Temperature control as listed in chapter 6 Temperature Controllers.



Type HIL-IC 1000 °C

Heating cable with metal braiding inconel 2.4816

Application potential:
Radiation heaters, vacuum technology, submersible heaters, containers, valves, pumps, forms, process and plate heaters.
This mineral-insulated heating cable with a inconel braiding 2.4816 is applicable within extreme corrosive and damp surroundings. The HIL heating cable is extremely robust and easy to bend.
The inconel braiding is watertight, oiltight and gastight. A utilisation temperature of up to 1000°C enables a variety of applications.
The cold end of the heating cable can be fed into a terminal box and connected by means of a M20X1.5 screwed connection.

Operating temperature:	max. 1000°C
Rated voltage:	230 V AC/DC
Rated capacity:	100 / 200 / 250 W/m
Outer jacket:	inconel 2.4816
Length of cold ends:	0.5 m
Protection class:	IP 67 (EN60529)
Protective conductor:	yes
Protection class:	I

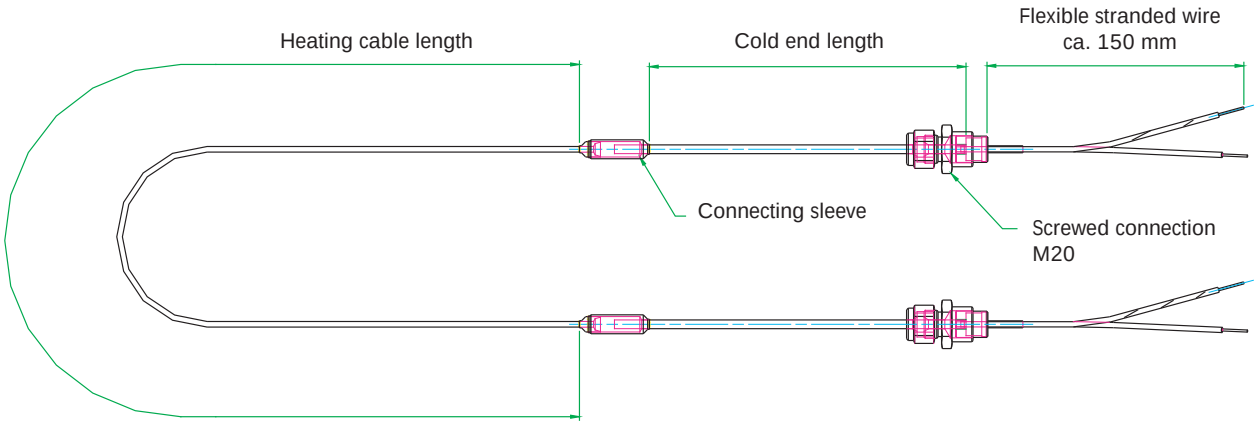
Temperature control as listed in chapter 6 Temperature Controllers.

Metres	100 Watt/m	Order Nr.	AD Ø mm	Ohm/ Metres	Bending radius mm
7,2	720	HIL-IC/10007	3,2	10,0	> 15
9,1	910	HIL-IC/10009	3,2	6,3	> 15
11,5	1150	HIL-IC/10011	3,2	4,0	> 15
14,5	1450	HIL-IC/10014	3,6	2,5	> 18
18,0	1800	HIL-IC/10018	3,8	1,6	> 18
23,0	2300	HIL-IC/10023	4,1	1,0	> 20
29,0	2900	HIL-IC/10029	4,5	0,63	> 20
36,0	3600	HIL-IC/10036	5,0	0,4	> 30
46,0	4600	HIL-IC/10046	5,6	0,25	> 30
57,5	5750	HIL-IC/10057	6,5	0,16	> 35

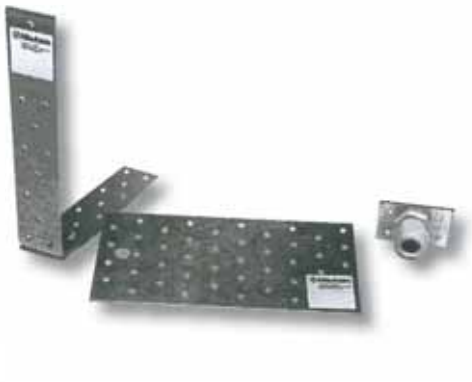
Metres	200 Watt/m	Order Nr.	AD Ø mm	Ohm/ Metres	Bending radius mm
5,1	1020	HIL-IC/20005	3,2	10,0	> 15
6,5	1300	HIL-IC/20006	3,2	6,3	> 15
7,7	1540	HIL-IC/20008	3,2	4,0	> 15
10,3	2060	HIL-IC/20010	3,6	2,5	> 18
12,7	2540	HIL-IC/20012	3,8	1,6	> 18
15,5	3100	HIL-IC/20015	4,1	1,0	> 20
20,3	4060	HIL-IC/20020	4,5	0,63	> 20
25,6	5100	HIL-IC/20025	5,0	0,4	> 30

Metres	250 Watt/m	Order Nr.	AD Ø mm	Ohm/ Metres	Bending radius mm
4,6	1150	HIL-IC/25004	3,2	10,0	> 15
7,3	1800	HIL-IC/25007	3,2	4,0	> 15
9,2	2300	HIL-IC/25009	3,6	2,5	> 18
12,0	2870	HIL-IC/25012	3,8	1,6	>18
14,0	3500	HIL-IC/25014	4,1	1,0	> 20
18,0	4550	HIL-IC/25018	4,5	0,63	> 20
23,0	5750	HIL-IC/25023	5,0	0,25	> 30

Practical examples



Accessories



Bracket of V2 A steel

For fixing the connection housing to piping or tanks.
Insulating bushing for heating tapes heavy-gauge conduit thread 16 with V2 A plate.
The following controllers can be fitted on the assembly plate of V2 A in conjunction with the bracket: AZT, UTR, HZ-EK 2 with HT 53, the threads are predrilled and provided with V2 A bolts.

Order Nr.	
HZ/MW	bracket
HZ/MP	plate
HZ-I	entry

Connection housing IP 65

Both housings are provided with heavy-gauge conduit thread

Order Nr.	Length x Width x Heigth	Clamp
HZ-G	94 x 65 x 56 mm	5 x 4 mm²
HZ-K	94 x 94 x 56 mm	8 x 4 mm²

KSP - 130°C

Heat stabilised plastic tie for fastening heating cables and heating tapes.

Order Nr.	Length x Width	Supplied unit
KSP/200	200 mm x 4.8 mm	100 pcs.
KSP/360	360 mm x 4.8 mm	100 pcs.
KSP/450	450 mm x 7.8 mm	100 pcs.

AB

Spacer tape for fastening plastic insulated heating cables for surface and cylindrical heating.
Smallest installation spacing: 15 mm.

Order Nr.
AB/015

ABF

Spacer tape of VA 1.4301 for placing heating tapes on tanks. The spacer tape can be fastened by spot-welding or with taut ribbons.
Smallest installation spacing: 45 mm.

Order Nr.	Supplied unit
ABF/045	5 m

Accessories

GKB +160 °C

Adhesive tape. Glass fabric with acrylate adhesive (curing) for fixing heating strips and temperature sensors.
Can be used up to a maximum of 160°C.

Order Nr.	Breite	Supplied unit
GKB/160	15 mm	55-m-roll

GKB +180 °C

High-grade adhesive tape, glass fabric with silicone adhesive. Adhesive stabile up to 180°C.

Order Nr.	Width	Supplied unit
GKB/180	19 mm	33-m-roll

GAB +160 °C

Heavy-duty aluminium foil tape with acrylate adhesive (curing) for the adhesion of plastic insulated heating strips, cables and pipes. The aluminium ensures very good heat dissipation and distribution.

Order Nr.	Width x Thickness	Supplied unit
GAB/160	50 mm / 0,13 mm	55-m-roll

GB +450 °C

Thin, adaptable glass tape to tie off and wrap heating cables and temperature sensors.
Can be used up to a maximum of 450°C.

Order Nr.	Width x Thickness	Supplied unit
GB/25	25 mm x 0,16 mm	50-m-roll
GB/16	16 mm x 0,16 mm	50-m-roll

GBB +450 °C

Wide glass filament tape for wrapping heating cables. Suitable for thicker pipes and tanks. Maximum operating temperature 450°C.

Order Nr.	Width x Thickness	Supplied unit
GBB/75	75 mm x 1,2 mm	100-m-Rolle

GBW + 450 °C

Fluffy, about 3 mm thick glass-fibre fabric tape for insulating heated routes.

Order Nr.	Width x Thickness	Supplied unit
GBW/25	25 mm x 3 mm	30-m-Rolle

KSV + 130 °C

Simple to use Velcro closures to tie up and fix insulating sleeves on pipes.

Order Nr.	Width x Thickness	Supplied unit
KSV/25	25 mm	10 m Velcro, 2 m coating

Accessories

SJ + 200 °C

Close pore, waterproof silicone hose for insulating pipes and hoses. Operating temperature up to 200°C.
10 mm insulation thickness. SJ/15 with 7.5 mm insulation thickness.

Order Nr.	inner diameter
SJ/15	15 mm
SJ/20	20 mm
SJ/25	25 mm
SJ/30	30 mm
SJ/40	40 mm

Also available are polymer foam hoses for insulation up to 100°C with similar dimensions.

MG + 450 °C

Needle-punched glass-fibre mat for insulating pipes and tanks. Operating temperature up to 450°C. K-valves (W/m2k), 3.3 at 50°C, 5.8 at 200°C.

Order Nr.	Width	Thickness
MG/12	1000 mm	12 mm

MQ + 1000 °C

High-grade, flexible ceramic fibre mat for insulation in the temperature range up to 1000°C. K-valves (W/m2k) 1.7 at 50°C, 6.5 at 500°C.

Order Nr.	Width	Thickness
MQ/10	900 mm	15 mm

GSH + 450 °C GSI + 250 °C

Glass fabric hoses for insulating electrical cables.
Maximum operating temperature at 450°C.
With external coating silicone max. operating temp. at 250°C.

Order Nr.	inner diameter	Order Nr.	inner diameter
GSH/04	4 mm	GSI/04	4 mm
GSH/06	6 mm	GSI/06	6 mm
GSH/08	8 mm	GSI/08	8 mm
GSH/10	10 mm	GSI/10	10 mm
GSH/12	12 mm	GSI/12	12 mm

GSK + 900 °C

High-grade, quartz fabric hoses for insulating electrical cables, maximum operation temperature at 900°C.

Order Nr.	inner diameter	Supplied unit
GSK/04	4 mm	10 m
GSK/30	30 mm	5 m

Accessories

FIL + 260 °C

Connection wires of CuNi with PFE insulation for wiring in the temperature range up to 260°C, in various colours.

Order Nr.	Cross section	Supplied unit
FIL/075	0,75 mm²	10 m
FIL/150	1,50 mm²	10 m
FIL/250	2,50 mm²	10 m

Tube of silicone adhesive 25 g
KF-SILT 25

Tube of silicone adhesive 100 g
KF-SILT 100

Silicone adhesive in tubes for the manufacture of self-prepared connections for HKSI heating tapes (silicone adhesive technology). You need 10 to 15 g adhesive per heating tape.

KA

Porcelain terminals, can be used up to 250°C.

Cross section	Supplied unit
1 x 2,5 mm²	10 Stück
2 x 2,5 mm²	10 Stück
3 x 2,5 mm²	10 Stück
4 x 2,5 mm²	10 Stück

Spring terminals / supporting rails

Designation
Spring terminal, 4 mm², grey
Spring terminal, 4 mm², blue
Spring terminal, 4 mm², gn-ge
Cover plate, 4 mm², grey
Supporting rail, 35 mm
End bracket for supporting rails

Surface mounted switch

3-pin surface mounted switch according to EN 60947, VDE 0660.

Technical data	
Max. switchable voltage:	440 V AC acc. DIN VDE 0106 part 101
Max. continuous current:	20 A
Degree of protection:	IP 65
Cable glands:	4 x PG 16
Housing dimensions:	100 x 80 x 106 mm (H x B x T)

Residual current operated circuit breaker (RCCB)

For permanent connection to equipment or extension cable, all pole disconnection, residual current plug according to DIN VDE 0661.

Technical data	
Rated actuation current:	10 mA (residual current)
Undervoltage tripping:	16 A, 230 V ~
Housing dimensions:	55 x 100 x 54 mm

Heating tape sensor

Thermostatic switch

For simplest control requirement and temperature monitoring.

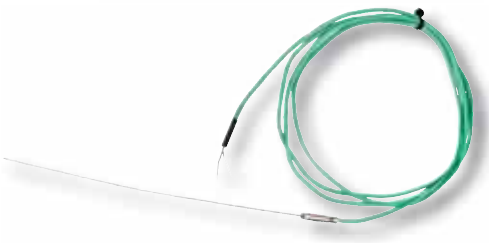
Technical data	
Switching power:	max. 10 A (2300 W)
Switching frequency:	app. 10000 switching cycles
Shutdown point:	±5 K to the rated actuation temperature
Reclosing point:	about 30 ±15 K below the shutdown point

Rated switching temperature	80 °C / 100 °C / 120 °C / 140 °C / 160 °C / 200 °C

Thermocouple flat sensor +450 °C

with 1.5 m long silicone insulated equalizing cable

Order Nr.	Sensor type
HT/FF	Fe-CuNi(J)
HT/NF	NiCr-Ni(K)



Thermocouple bar sensor +600 / +1000 °C

Mineral insulated, sensor tip bendable, can be soldered, preferably for use at high temperatures, in fluids and in corrosive atmospheres, diameter 1.5 mm, length 250 mm, silicone insulated, 2 m long equalizing cable

Bestell-Nr.	Fühlerart	Max. Temperatur	Mantelwerkstoff
HT/FM	Fe-CuNi(J)	600 °C	1.4571
HT/NM	NiCr-Ni(K)	1000 °C	2.4816 (Inconel)

Pt 100-Fühler

+200 °C	+250 °C +350 °C	+500 °C
Brass	Jacket material 1.4571,	Jacket material 1.4571
diameter 4 mm,	diameter 4 mm,	diameter 5 mm,
length 30 mm,	length 40 mm,	length 40 mm,
PTFE insulated,	PTFE/glass fil. insulated,	glass filament insulated,
2 m cable	2 m cable	2 m cable

Order Nr.	Order Nr.	Order Nr.
HTI/MS	HTI/PM HTI/PH	HTI/PT

Pt 100 also available in ex-proof.

Compensating cables

For extending the connection cables of the temperature sensors listed above. Structure: silicone/silicone insulated, 2 x 0.25 mm2, diameter 5 mm

Order Nr.	Sensor type
AG/F	Fe-CuNi(J)

Self-adhesive sign

Electrically heated, 50 x 200 mm

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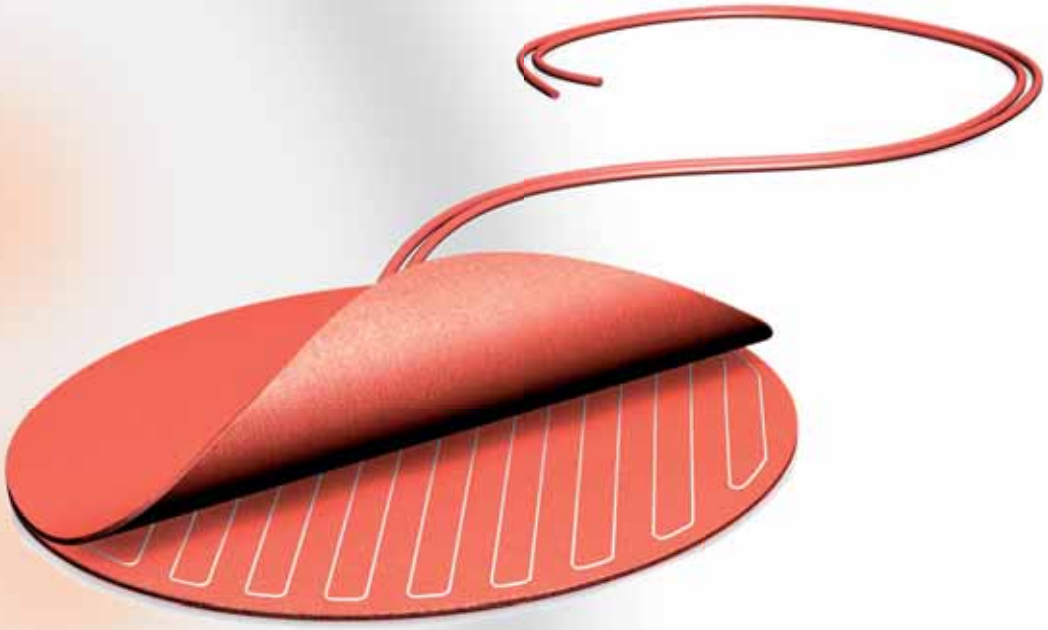
Surface Heating Elements



Type HP 60 — 60 °C

Robust heater tarps for large surfaces

Applications:
Heating or temperature regulation of large surfaces and containers up to 60 °C, e.g. IBC containers, silos, lorries.

The heater tarp is warmed with electric heater elements sealed in coated polyester fabric. The tarp's surface is washable and spray waterproof (IP 65). It can optionally be ordered with a 5 mm thick layer of thermal insulation.

The shape of the HP 60 heater tarp can be individually adapted to container sizes; this includes both round and square openings. Options for fastening, by way of hooks, eyes and Velcro, make attachment easy.

The HP 60 heater tarp is rated to produce up to 500 Watt of heat per m^2; depending on ambient temperature, this ensures a short warm-up time for the tarp. When a 3 Ph/Np power source is available, a connected load of up to 11 KW per tarp is possible.

Operating temperature:	max. 60°C
Rated voltage:	12 ... 500 V AC/DC (one, two, or three phase)
Rated power:	up to 500 W/m^2
Min. ambient temperature:	+ 5°C
Material:	polyester fabric with PVC coating
Dimensions:	max. 3000 - 7000 mm
Heater element thickness:	5 mm
Fastening options:	hooks, eyes, velcro
Temperature sensor (optional):	PT100
Connecting cable:	3 m
Plug connection:	see table on page 84
Protection grade:	IP 65 (EN60529)
Protection class:	I

Sensors can be placed either in or on the heater tarp to monitor temperature or provide regulation. Especially effective is our HTI 16 integral electronic regulator/limiter combination which allows the heating conductors in the tarp to also act as probes; thus the heating tarp's limit temperature can be monitored while simultaneously regulating the temperature of the medium in the container precisely with a separate PT100 probe. Our temperature regulators can be found in Chapter 6.

Type HSI 200 °C

Flexible silicone heating mats, splash-proof

The silicone heating elements are characterised by highly uniform heat distribution. They are very flexible and available in many different versions. As foils, mats or shaped components they are already in use as an economic solution in innumerable applications.
They are always manufactured especially for the particular requirements.

Operating temperature:	max. 200°C
Rated voltage:	230 V AC/DC
Rated power:	6500 W/m² (standard) and more
Min. ambient temperature:	- 60°C
Material:	Silicone, silicone-coated glass-fibre fabric
Dimensions:	max. 910 x 2400 mm
Heater element thickness:	3 mm
Fastening options:	Adhesive, binding, velcro, hooks, eyes
Temperature sensor (optional):	vulcanized enclosed or in sensorpocket PT 100, FeCuNi
Excess temperature safeguard:	with 2. PT 100 or switch
Connecting cable:	Standard: cast in a silicon block. Optionally: cable / stranded
Plug connection:	see table on page 84
Protection grade:	IP 65 (EN60529)
Protection class:	I

Temperature control using our control equipment, as listed in chapter 6 Temperature Controllers.

Type HMS ...

The heating mats that can be supplied at short notice, are very flexible, so that they can be used not only on flat surfaces, but also on cylindrical tanks and pipes. A NiCrNi sensor is incorporated in every mat for temperature control. The temperature stabile connection leads are 1 m in length.

Standard heating mats for pipes.

Technical data:

Size in inches	DN	Width (mm)	Length (mm)	HMST	HMSG	HMSQ
1“	38	135	500	50 W	250 W	500 W
2“	70	236	500	150 W	500 W	1000 W
3“	108	355	500	250 W	1000 W	2000 W
4“	159	515	500	350 W	1200 W	2400 W
5“	205	659	500	500 W	1600 W	3200 W
6“	256	820	500	690 W	2000 W	

Special dimensions can be supplied at any time.

HMST — up to 250 °C

This heating mat uses a metal grating as the carrier. The heating conductors are PTFE insulated and are provided with a safety conductor braiding. The maximum operating temperature is 250°C. With Velcro closures (accessory), the heating mat can be placed around tanks and pipes.

HMSG — up to 450 °C

HMSG is a very flexible heating mat made of woven glass-fabric with a maximum operating temperature of 450°C. The glass yarn insulated heating conductor is incorporated on both sides in the woven glass fabric. The heating mats are provided with eyes on the longitudinal side, with which they can be fastened by means of woven glass tape (accessory).

HMSQ — up to 900 °C

This flexible heating mat of high-grade woven ceramic fibre has a maximum operating temperature of 900°C. It is fastened to pipes or tanks using high temperature stable cords (accessory).

Type HMM 250 °C

Hinged sleeves with metal jacket

The HMM heating sleeve is a complete heating element consisting of heating, thermal insulation and a closed external jacket of metal. The metal jacket encloses all edges and the inner surface of the sleeve, which consists of two half shells. One side is provided with a hinge, on the other side there are adjustable turnbuckles. This allows for compensation of the tolerances in the outer diameter. The length, inner diameter and insulation thickness are designed for your specific application.
Longer built-on accessories can consist of several segments.

Operating temperature:	250°C with moisture protection of heating element
Rated voltage:	230 V AC (others on request)
Rated power:	taylored to respective needs
Material:	aluminium or stainless steel
Height:	max. 2000 mm
Inner diameter:	75 - 2000 mm
Temperature sensor:	Fe-CuNi type J, NiCr-Ni Typ K, PT100 and integral control system (HTI) are possible
Conneting cable:	1.5 m
Plug connection:	see table on page 84
Protection grade:	IP 40 (basic design) IP 54 (on request))
Protection class:	I

Type HFH 450 °C

Heating sleeve with glass filament fabric jacket

The design is similar to type HMM. How-ever, the complete heating sleeve consists of glass filament fabric, which can be laid very easily and tightly around the heated item. The sleeves are adapted especially for the heated item.

Operating temperature:	up to 250°C with PTFE - heating conductor up to 450°C with glass- heating conductor
Rated voltage:	230 V AC (others on request)
Rated power:	taylored to respective needs
Material:	glass filament
Dimensions:	as request
Inner diameter:	75 - 2000 mm
Temperature sensor:	Fe-CuNi type J, NiCr-Ni Typ K, PT100 and integral control system (HTI) are possible
Conneting cable:	1.5 m
Plug connection:	see table on page 84
Protection grade:	IP 40 (basic design) IP 54 (on request))
Protection class:	I

Examples
Special types HFH

Heating for vacuum systems

These high vacuum pumps are heated with a removable, split heating sleeve to 350°C.
The condition was a uniform distribution of heat over the complete surface.

Removable insulating heating sleeve

The complicated geometry can be insulated against heat loss and heated through splitting into several segments in an inexpensive and easy to service manner. All components can be easily and quickly closed and removed by means of Velcro closures.

Heating mobile tanks

The removable heating sleeve has been adapted here to the mobile tank by means of thermal insulation and temperature control.

Pressure sensor heating

This high-grade capacitive pressure sensor is heated to the required 160°C by means of a removable heating sleeve.

Heating sleeve on a carrier

Simple surfaces, as well as a group of several components, for example a pump with valve and pressure gauge, can be heated by means of an enclosed cage consisting of heating sleeves on carriers of perforated high-grade steel sheet.

Heating for reactors up to 800°C

A temperature of 600°C was required for the pilot plant for recycling plastic-coated aluminium so as to thermally separate the plastic and aluminium in this reactor with conveyor screw.
By means of several individually controlled heating circuits, a precisely matching distribution of heat was achieved by the heating.

Type HM 20 K — 120 °C

Robust barrel heating mat

Heating sleeves to heat segments of 200 litre barrels per DIN. Both the inner and the outer sheath of the barrel heating sleeve are made of aluminium sheet, which ensures maximum protection of the electrical components against mechanical damage.
A hinge with clamping closure that divides the heating surface into two semi-shells permits convenient assembly, without the heating element needing to be bent. The barrel can be heated complete by using 3 sleeves.
The integrated thermal insulation increases efficiency and reduces the temperature of the touchable surfaces. In the attached aluminium housing, the heating surface temperature can be set in a range from 30 to 110°C via a mechanical thermostat. In addition to the temperature controller, a 120°C thermal switch and a 140°C thermal fuse is built into each semi-shell to protect against overheating.
With the HFT socket distributor it is also possible to precisely regulate the temperature of the barrel contents via a temperature controller and an immersed PT 100 sensor.
For lower temperature we recommend our heater tarp HP 60 on page 64.

Operating temperature:	0 to 250°C
Rated voltage:	230 V AC (others on request)
Rated power:	1400 W
Material:	aluminium plate
Dimensions:	570 mm, height 230 mm
Heater element thickness:	17 mm
Conneting cable:	2 m in rubber hose
Plug connection:	protection plug
Protection grade:	IP 65 (EN 60529)
Protection class:	I

Order-Nr.		
HM 20	without control	option: PT 100 sensor
HM 20 K	with control	

Type HFI 20

Barrel insulating sleeve

Robust and high-grade insulation for 200 litre barrels. Simple assembly by means of Velcro closures and hooks.

Type HB 20 K

110 °C

Heavy-duty, stabile barrel base heating panel

The design of aluminium and galvanised steel ensures the function and safety even under severe conditions of use. The temperature control is located on the underside, protected in an aluminium housing. The heating surface temperature can be adjusted between 30°C and 110°C.

Operating temperature:	30°C to 110°C
Rated voltage:	230 V AC (others on request)
Rated power:	1300 W
Material:	aluminium or steel galvanized
Dimensions:	Ø 510 x 85 mm
Heater element thickness:	17 mm
Conneting cable:	2 m in rubber hose
Plug connection:	protection plug
Protection grade:	IP 65 (EN 60529)
Protection class:	I

Order Nr.		
HB 20	without control	option: PT 100 sensor
HB 20 K	with control	

Type HFV / HFT / HFP

Multi-socket outlet with temperature control of the barrel content

The plastic housing with four socket outlets with earth contact, mains switch and optionally with thermostat for the barrel content is placed next to the barrel.

Operating temperature:	0 to 100°C
Rated voltage:	230 / 400 V AC
Switching power:	3 x 3500 W
Temperature controller:	HT 53
Connection cable:	1.5 m with CEE plug 16 A
Protection grade:	IP 54
Protection class:	II

Order Nr.	Version
HFV	just terminal block with four socket outlets with earth contact, mains switch
HFT	with thermostat, four socket outlets with earth contact, mains switch
HFP	Temperature sensor for barrel, PT 100 in VA pipe 6 x 1400 mm, 1.5 m supply lead

Type HAP 200 — 200 °C

Pressure-proof aluminium electric heating plate

Applications:
These can be fabricated for use in warming tables, cabinet heaters, cooling tables, heating plates for form carriers or even radiating heaters for household use.

HAP 200 aluminium heating plates cover a temperature range of up to 200°C. They can handle extreme pressure loads and are impact and vibration resistant. Their shapes can be individually fabricated – whether round, oval or L-shaped. Special designs with cut-outs, bore holes and bolt threads are possible. Even combinations with liquid and air channels for cooling can be implemented.

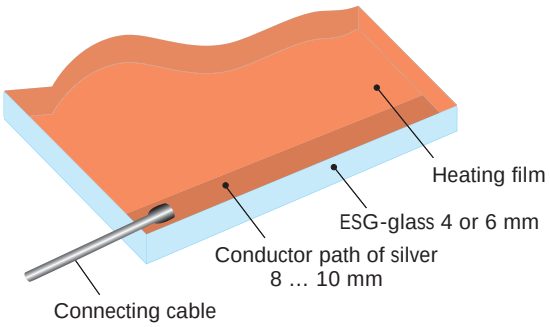
Operating temperature:	200 °C maximum, optionally 250 °C
Rated voltage:	12 ... 500 V AC/DC (one, two, or three phase)
Rated power:	up to 5000 W/m²
Material:	aluminium (AlMg3 EN-AW-5754), optionally stainless steel
Dimensions:	100 x 100 mm to 1250 x 2500 mm
Heater element thickness:	4 / 6 / 7 / 8 / 9 / 10 / 12 mm, special dimensions possible
Weight / m2	thickness: 4 mm about 11 kg, 6 mm about 16 kg, 8 mm about 21 kg, 10 mm about 26 kg
Surface:	rolled aluminium, others on request (painted, anodized, etc.)
Temperature sensor (optional):	PT100 / Fe-CuNi (J)
Connecting cable:	3 m long, with or without plug
Plug connection:	see table on page 84
Ingress protection:	IP 40 - IP 65 (EN 60529), depending on heating conductor
Safety class:	I
Sensor regulation:	via our HT - 40 microprocessor regulator unit
Pressure load:	depending on heater element thickness

Sensors can be placed either in or on the heating plate to monitor temperature or provide regulation. Our HTI 16 integral temperature regulator can make use of the built-in heating conductor as a sensor to monitor the heating plate‘s limit temperature and in parallel make use of a separate probe to precisely regulate the temperature of the medium. Our temperature regulators can be found in Chapter 6.

HVT Hillesheim VitroTherm

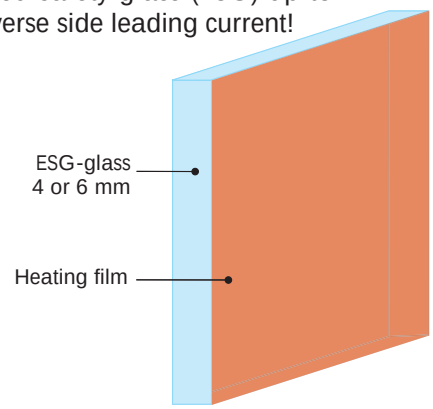
Glass-elements with which one can heat. That was made possible by special development to coat tempered saftey glass with a breath-fine heating-material.

Basic configuration



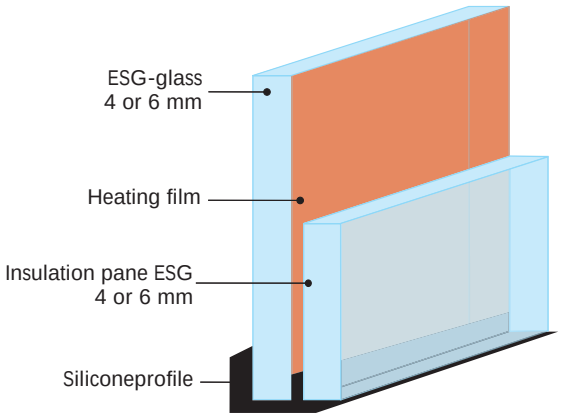
HVT 1 Basic element

as tempered safety glass (ESG) up to 250°C, reverse side leading current!



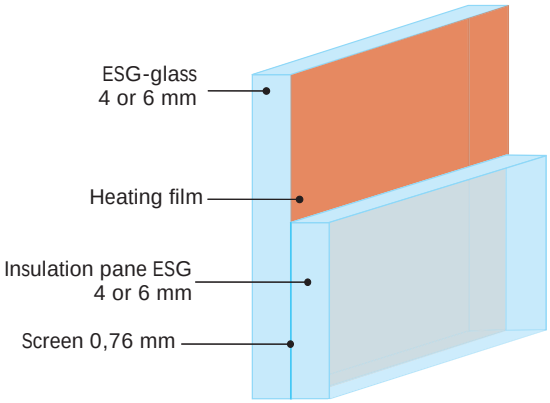
HVT 2

as HVT 1, however with safety glas insulating pane (ESG) and F-profile up to 200°C



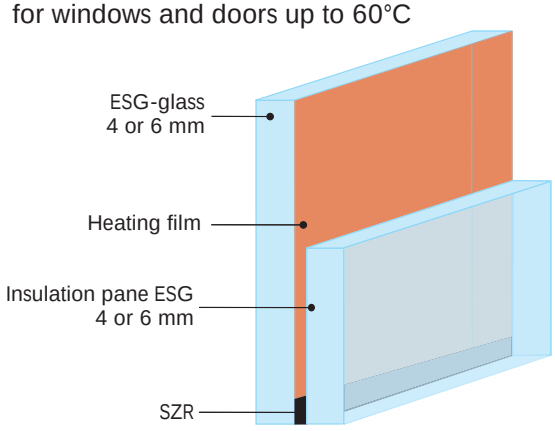
HVT 3

as compound safety glass (VSG) up to 60°C



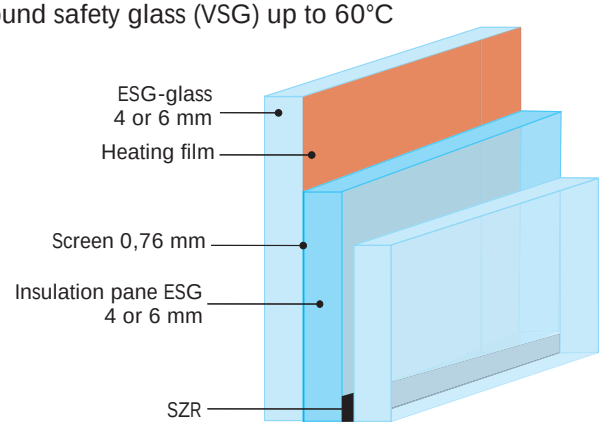
HVT 4

Heating-pane as insulation glass element for windows and doors up to 60°C



HVT 5

as HVT 4, however, heating-pane laid out as compound safety glass (VSG) up to 60°C



ESG = single pane tempered safety glass VSG = compound tempered safety glass SZR = distance between panes

HVT 1 basic element — 250 °C

Rated voltage:	12 – 400 V AC/DC
Power consumption:	up to 3 KW per m²
Continuous temperature load:	controlled according to construction up to 250°C
Glass thickness:	4 - 6 mm, ESG
Light permeability:	about 75%
Area:	from about 0.1 to 4 m²
Weight:	4 mm 10 kg/m², 6 mm 15 kg/m²
Control:	attachment of sensors is possible
Accessories:	controller types freely selectable

Additional characteristics:

- high transparency
- large scale and uniform heat development
- high heat emission 90 - 95%
- very brief heating up time through high power output with low mass
- high tensile strength through ESG safety glass
- high service life, no measurable wear

Sample applications:

- flat radiators in many shapes, colours and sizes
- wall and floor heaters, also flush-fitted
- drying ovens
- heat panels
- heated windows or doors
- mist-free windows in cold-storage depots, refrigerated display cabinets, construction machinery
- sight glasses on machines and installations
- additional heating for window ledges, tiled ovens and tiled walls
- heating elements for industry
- heating elements for aquariums and terrariums
- heating elements for indoor swimming pools and hospitals

Storage programme HVT 1 elements, dimensions in cm, capacity from 1.0 - 3.0 kW according to voltage

25 x 15
30 x 15
30 x 30
50 x 25
40 x 40
50 x 50
50 x 100

HVT 4 and 5 Insulation glass heating elements — 60 °C

Rated Voltage:	50 - 230 V
Power consumption:	approx. 400 - 800 W/m²
Temperature:	max. 60°C
Glass thickness:	see construction
Translucence:	approx. 80 %
Area:	min. 0.1 - max. 4 m²

Safety transformer RKG / SKG

Isolating transformer in housing for HVT – Glass heating elements

This toroidal-core current transformer (according to VDE 0551) is required for operating heating systems with an extra-low voltage protection.
The output capacity of 1000 VA covers a wide range of use.
The following are available as extra-low voltage 35 / 42 / 50 Volt ~.
The start current limiter prevents the actuation of extra-low back-up fuses.

RKG 1000	
Input voltage:	220 - 230 - 240 Volt AC
Output voltage:	35 / 42 / 50 Volt AC
Output current:	28.6 / 23.8 / 20 A
Frequency:	50 - 60 Hz
Output power:	1000 W
Protection class:	I
Protection grade:	IP 20 (EN 60529)
Weigth:	12.5 Kg
Housing:	Sheet metal casing
Housing dimensions:	302 x 222 x 155 mm (H x W x D)

Start current limiter, output fuse 25 A, Input/output on terminals, 1 mains switch.

SKG / Variable transformer	
Input voltage:	230 Volt AC
Output voltage:	0 - 42 Volt controllable
Protection class:	I
Protection grade:	IP 20 (EN 60529)
Output current:	6.3 A
Frequency:	50 - 60 Hz
Housing:	Sheet metal casing
Housing dimensions:	200 x 200 x 120 mm (H x W x D)

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Special Developments

Providing heat
Retaining heat

Airtherm air heater 100 °C

Air heater with highly flexible connector hose

The Airtherm air heater was designed specifically to heat compressed air. The air is heated in the connector head, which is equipped with a ceramic heating element and corresponding sensor. The feed connection is by way of a highly flexible hose, in which both compressed air and the power cable are integrated. Separation of air and electrics takes place in a connector housing.

Opertaing temperature:	20 to100°C
Rated voltage:	230 V AC / 50 Hz
Rated power:	500 W
Connecting thread:	G ¼“
Air pressure range:	1 to 8 bar
Protection class:	IP 54 (EN 60529)
Manufacturing lengths:	2.5 m, 5.0 m, 7.5 m, 10 m (Special lengths on request)

Depending on the requirements, the air temperature can be set up to max. 100°C (measured at the pistol nozzle). The compact form permits easy integration into existing systems.

Applications:

Painting technology:
Automatic paint spraying systems, painting robots, manual spraying, prevention of condensation;

Breathing air heating (protective wear):
In fire fighting, chemical industry, tank cleaning, ...

General mechanical engineering

Depending on the connector housing version, the Airtherm is also suitable for use in explosive environments. The power cable is 2 metres long and modified for connection to a controller specifically conceived for this application.

For control purposes use our HT 40 controllers, the HT 55L with special air handling software (permits connection of 2 Airtherms), or an appropriately certified Airtherm controller for the explosion-proof application (EEX E II 200°C T 3) (installed outside the explosive environment zone).

HFM – flexible heating jackets

600 °C

Flexible heating jackets are a further development of the heating tape plus insulation and are suitable as tracer heating for already installed as well as preshaped customer pipes. Heating of bundles of pipes is also possible.
The heating jackets HFM are pushed on the pipes that are to be heated. As a result, the customer has an easy to assemble heating system.

Operating temperature:	max. 600°C
Rated voltage:	230 V AC (other voltages are possible)
Insulation:	to 250°C Silicone to 450°C Textile glass to 600°C Silicate fibre
Heating conductor lengths:	0.3 m to about 10 m; optionally can also be split into individual segments, so that greater lengths or complete installations can be incorporated in the system.
Pipe diameter:	from capillary to 50 mm diameter (larger diameters on request)
Carrier material:	flexible metal corrugated hose
Bending radius:	adapting to heating system
Connecting cable:	1.5 m
Plug connection:	see table page 84

Temperature control using our control equipment, as listed in chapter 6 Temperature Controllers.

SMI

150 °C

Clip-style tracer heating

This tracer heating for thin steel and copper pipes consists of a silicone profile with two parallel worked-in heating conductors. The slotted shape enables pipes to be heated in pre-assembled piping systems - for example, in analytical cabinets - without these having to be dismantled for heating. This saves considerable assembly costs.
The version available at the moment covers piping from 6 - 10 mm (outer diameter). The lengths and outputs are flexibly adapted to customer request.

HIF tracer heating 200 °C

Type A Type B

For hoses and pipes

Applications:
Frost protection during water analysis, in washing and cleaning systems, for hose systems in general and as temperature stabilization for general applications.

The HIF tracer heating series is designed for antifreeze heating, respectively to compensate for heat losses in hoses and pipes. You can install HIF easily in your existing hose system. It requires very little power, since it heats within the medium. It does not require any expensive attachments or insulation, and you can also heat media with a low storage capacity as it flows.
It can be individually adapted to your requirements.

Operating temperature:	max. 200°C
Rated voltage:	230 V AC
External thread:	1“, optional ½“
Connector head:	As a closure section with axial cable feed or with integrated flow of the medium via a fitted tappet (optional external thread) and side cable feed.
Material connector head:	1.4305
Heating loop:	Can be cut to size as required, optionally also available as a double loop.
Special feature:	Teflon® jacket (suitable for corrosive media)
Heating wires:	About 2.5 mm diameter, including insulation and earth conductor braiding.
Connection cable:	2 m
Protection grade:	IP 54 connection housing or IP 65 cast connection housing
Protection class:	I
Optional:	The degree of protection: Protective separation or protective extra-low voltage are possible by means of suitable isolating transformers. As a special version, HIF can also beoperated with control (integral meauring principle). With this higher capacities and operating temperatures up to 200°C can be achieved.

HTI-Heating tape with the heating conductor as a sensor 180 °C

The HTI heating tape is supplied from a reel, cut to size as required and can be connected directly to the control devices HTI 15 and HTI 10.
For temperature measurement and control, complete length of heating tape is used. No sensors and are required for temperature control on the object to be heated.

Operating temperature:	180°C
Rated voltage:	max. 230 V AC/DC
Rated power:	70 W/m at 20°C
Length of heating circuit:	max. 60 m
Contact clearance:	2 m
Min. bending radius:	50 mm
Outer dimensions:	app. 8 x 11 mm (oval)
Protection class:	I
Protection grade:	IP 65 (EN 60529)

The terminal connection technology can be fitted in situ by customer using our assembly sets KF (page 46). Uniform temperature measurement over the complete surface, the high capacity during the heating up phase and removal of the excess capacity during the steady state phase, produce low operating costs.

Analyse Heating hose with the HTI Controller - heating tape 180 °C

Just as easily you can obtain hoses that have been heated with the HTI heating tape. The hose structure with heating tape and insulation is complete: Cut to size, fit end cap, connect – ready.

Operating temperature:	max. 180°C (integrally controlled)
Rated voltage:	230 V AC
Rated power:	70 W/m at 20°C
Surface temperature:	max. 200°C
Length of heating circuit:	max. 60 m
Contact clearance:	2.0 m
Min. bending radius:	depending on DN
Outer dimensions:	app. 8 x 11 mm (oval)
Protection class:	I
Protection grade:	IP 65 (EN 60529)

Heating sleeve HFH Special 120 °C

This heating design - which features a special electronic temperature control unit - enables the utilisation of diesel motors which must be started or operated under -20°C.
This type of heating prevents the condensation of gases and liquids at temperatures under
-20°C. The heating is switched on through an outdoor sensor when an optionally selectable lower temperature falls short of the setting. A timer releases the heating power only after start-up of a dynamo in order to prevent the battery from being emptied. A second integrated control mechanism adjusts the operating temperature. It turns off if the outdoor temperature exceeds -20°C. In addition, the heating has excess temperature protection.
The outer protection material consists of PTFE-walled glass silk fabric which can withstand very rough conditions of utilisation.
At customer request, this heating with invisible, built-in control unit can be supplied as a collar with Velcro fastening or as a structural flat mat.

Heating sleeve for tubes and cartridges 250 °C

The heating sleeve is a special physical form that can be adapted to the specifications of tubes and cartridges. Conventional dimensions as well as special shapes for one or more casks can be realised. The finished heater consists of a heated inside tube, thermal insulation and an outer jacket. These are available in a diverse array of high-quality materials that can be selected to match the application. The compact design with self-regulating PTC heating elements or standard heaters with integrated regulation guarantee optimal functionality and the highest level of safety.

Operating temperature:	max. 250° C
Betriebsspannung:	230 V AC/DC (andere auf Wunsch)
Material Innenrohr:	aluminium or stainless steel
Dimensions:	to specification
Heating element:	PTC heating technology, alternatively resistive heating
Temperature detection:	(resistive heating) PT100
Integrated regulation:	(resistive heating) HT54 temperature regulator
Connector type:	Euro safety plug or per specification
Protection grade:	ab IP 40, IP 54 (EN 60529) je nach Vorgabe
Protection class:	I

Thick-film heater elements, Miniature heater elements

High-performance hybrid systems with SMD technology

Hybrid elements offer advantages of small dimensions with high performance. They are suitable as outside-applied container heaters for use in laboratories, industry, smelting bodies, nozzle heaters and various applications in motor vehicles. These elements are vibration resistant and possess very good high-frequency characteristics. SMD technology permits control and regulation devices directly on the heater (max. 130 °C).

Specific surface rating:	15 to 77 W/cm² depending on paste material
Calibration:	to ± 0.1 % (absolute and relative) with laser
Temperature coefficient:	≤ 30 ppm / K
Temperature increase rate:	up to 100 K/s
Carrier material/thickness:	aluminium oxide Al2O3 / 0.25 mm < s < 1.3 mm; stainless steels 1.4016 and 1.4301 with pressed glass insulation 1 mm < s < 3 mm
Dimensions:	2" x 2" (50.8 mm x 50.8 mm), 4" x 4" (101.6 mm x 101,6 mm), other formats possible
Geometric shaping:	laser processing, stamping
Sensor technology:	preferrably PTC-Pt, Ni, NTC (also pressed on)
Over-temperature protection:	direct contact bi-metal monitors up to max. 200°C, optionally with tracer heater circuit for implementation of a limiter function, smelting safety (temperature dependent) Ø 4 mm
Heat conductor:	for Al2O3, preferably glued (max. 230 °C continuous temperature) in combination with aluminium sheet metal for heat distribution. Surface contact and direct contact with the medium for small surface loads; steel in direct contact with medium
Heat conductance:	25 W/mK
Breakdown strength:	8.3 KV/mm (210 V / mil)
Dielectric loss factor δ:	2·10-4 at 1 MHz
Chemical resistance:	see stainless steels and technical ceramics. Conductive and resistance pastes are dishwasher safe; when coated with polymers or special glass, also conditionally acid resistant.
Regulation:	by SMD technology; PD temperature regulator can be realised directly on the heater plate
Current rating:	1 A per mm width (depending on design, up to 3 A/mm possible)
Voltage rating:	100 V max (at 0.4 mm spacing)
Resistors:	resistor range 10-3-109 Ω
RoHs compatibility:	yes

hillesheim

Temperature Controllers

Information

Plug connection

Socket			compatible temperature controller
6 + PE (Binder 693 or similar)	Standard up to 10A	1 Sensor	HT 43 / HT 55 H
8 + PE (HANQ8 or similar)	Standard up to 16A	1 or 2 Sensoren	HT 41
2 + PE (STAKEI 200 or similar)	Standard up to 16A	Integral controller	HTI 16 / HTL 13
5 + PE (HANQ5 or similar) PT100 Sensor	Standard up to 16A	Integral controller + 1	HTP 16

Safety information

Hillesheim control equipment is designed for use in conjunction with Hillesheim heating systems. Please note the operating manuals and installation instructions that are provided with the equipment. When operating on other systems, please note the information provided for those systems. Generally valid are the acknowledged technical regulations as well as the specifications according to VBG4, VDE-regulations (for heating equipment VDE 0721)

Series HT 41 / 42

Compact controller / Limiter-Combination

The self-programmable temperature controller HT 41 / 42 is a universal controller due to its free configurability, its optional serial interface and the compact design for machine building, plant and apparatus construction.
Particular attention was given to the limiter function during the design of this device, with a permanent shutdown for unintentional operation according to DIN/VDE 0721 and on the high non-contact switch capacity of 3600 Watts.

Power supply:	230 Volt AC / 50 Hz or 24 Volt DC
Noise immunity:	EN 50 082-2
Emitted interference:	EN 50 081-1
Sensor types:	Fe-CuNi (J), NiCr-Ni (K) with reference point compensation and sensor breakage safeguard, sensor polarity reversal control PT 100, 2 conductors DIN/IEC
Fault limit:	0.1% - 0.2% of the range
Controller outputs:	electrical switch (control) 16 A, mechanical relay 16 A (limit/signal), Alarm output relay 6 A, limit compensation Y3, ±10 K of rated value
Controller response:	P-PID
Limiter function:	Signal over 2. PT 100
Cutout temperature limiter:	50°C - 500°C adjustable, actuates via mechanical relay
Display current / rated value:	four digit LED-display (13 mm)
Measuring range:	-199 to +999 digits
Deviation display:	7 LED ±12°C flashes
Operation:	Film keypad, 4 pushbuttons
Housing:	Makrolon
Housing dimensions:	148 x 90 mm
Assembly area:	160 x 100 mm
Fastening:	4 bores for bolts M4
Protection grade:	IP 65 (EN 60529)
Protection class:	I
Cable inputs / outputs:	**HT 41** 8+PE-pin socket Mains connection cable 1.2 m
	HT 42 KV-Glands without mains cable

Setting ex works: Sensor type: Pt 100	
	Control range
HT 41	0 – 200 °C
HT 42	0 – 200 °C

The customer can reprogram these parameters, or we will supply the setting as required (additional charge).

Series HT 43

Electronic compact controller

The temperature controller HT 43 is a universal controller for machine building, plant and apparatus construction due to its compact design.
During the design of this device, special attention was paid to simple and clear operation.
The controllers are set in the factory and cannot be reprogrammed.
The non-contact switch capacity is 2300 Watts.
All heating hoses in the standard ranges have a 6+PE-pin plug that fits precisely to this controller.

Power supply:	230 Volt AC / 50 Hz or 24 V DC
Noise immunity:	EN 50 082-2
Emitted interference:	EN 50 081-1
Sensor types:	Fe-CuNi (J), NiCr-Ni (K) with reference point compensation and sensor breakage safeguard, sensor polarity reversal control PT 100, 2 conductors DIN/IEC
Fault limit:	0.1% - 0.2% of the range
Controller outputs:	electrical switch (control) (10 A), larm output relais 6 A (s. HT 41 / 42), limit compensation Y3, ±10 K of rated value, Alarm output limit contact set at max. temperature range, Y2
Controller response:	P-PID
Display current / rated value:	four digit LED-display (13 mm)
Deviation display:	7 LED ±12°C flashes
Operation:	Film keypad, 4 pushbuttons
Housing:	Makrolon
Housing dimensions:	148 x 90 mm
Assembly area:	160 x 100 mm
Fastening:	4 bores for bolt M4
Protection grade:	IP 65 (EN 60529)
Protection class:	II
Cable inputs / outputs:	6+PE-pin socket, Mains connection cable1.2 m 1 x PG 7 for signal outputs

Setting at works:

Sensor type: Pt 100		**Sensor type: Fe-CuNi**		**Sensor type: NiCr-Ni**	
	Control range		Control range		Control range
HT 43 – 10P	0 – 100 °C	HT 43 – 10F	0 – 100 °C	HT 43 – 10N	0 – 100 °C
HT 43 – 20P	0 – 200 °C	HT 43 – 20F	0 – 200 °C	HT 43 – 20N	0 – 200 °C
HT 43 – 25P	0 – 250 °C	HT 43 – 25F	0 – 250 °C	HT 43 – 25N	0 – 250 °C
HT 43 – 50P	0 – 500 °C	HT 43 – 50F	0 – 500 °C	HT 43 – 50N	0 – 500 °C
		HT 43 – 100F	0 – 999 °C	HT 43 – 100N	0 – 999 °C

Series HTI 16

Integral Controller / Monitoring-Combination

The device convinces by being optimally matched to our trace heating systems, compact form and simple handling. Easy mounting using the mounting plate that is designed as cooling unit and modern connection systems are self-evident.
The HTI 16 Temperature Controller controls the temperature of heating conductor. Temperature measurement takes place via the resistance change in the heating wire without further sensors.
Rather than point measurement, the Integral Controller measures the average temperature over the entire length / surface of the heating system directly from the heating wire and registers a temperature change immediatley without any delay. The measured value corresponds to the temperature profile of the entire heating system rather than the temperature at a single point. A special nickel alloy is used as heating wire. For HTP 16 Controller-Monitoring you need an extra PT 100.

Nominal voltage:	230 V AC (optional 115 V / 400 V AC), 50 ... 60 Hz
Max. Load:	3600 W (max. 16 A resistive load, operating time 70 ... 80%)
Min. output current:	1 A resistive load
Temperature control range:	see type plate (-20 ... +250°C in 4 segments)
Temperature setting:	digital via buttons
Power unit:	Triac
Alarm relay:	Change-over relay 230 V AC, 6 A
Protection class:	IP 65 (EN 60529)
Dimensions:	81 x 161 x 65 mm (W x L x H) ABS housing without screw fittings / base plate
Terminal clips:	2.5 mm^2
Control:	Pulse package control with zero passage detection and defined heating pause
Version:	D – Ready to plug in with 2+PE-pole socket K – Terminal clips
Options HTP 16:	2. Regulator circuit with PT 100 probe as a combination Regulator/Monitoring

The HTI controller is always calibrated on the corresponding heating circuit. On supply of a heating system with an assigned controller system, the device is factory-set. The heating system and the controller are then coded accordingly. Calibration is stored as a mode and can be performed without undue effort in the event of a device change.
The measured value corresponds to the temperature profile of the entire heating system rather than the temperature at a single point.

Series HT 55

HT 55

HT 55 H

The self-optimizing compact dual controller

HT 55 is a universal controller for machine, system and equipment engineering thanks to its configurability and compact construction. When designing this device, special value was attached to simple and clear handling. Easy mounting on normed rails and the removable connectors (plug blocks) also guarantee operations in difficult installation conditions.

Power supply:	230 Volt AC / 50 Hz or 24 Volt DC 115 Volt AC / 50 - 60 Hz optional
Noise immunity:	EN 50 082-2
Emitted interference:	EN 50 081-1
Sensor type:	Fe-CuNi (J), NiCr-Ni (K), PT 100 DIN/IEC, Sensor breakage safeguard, sensor polarity reversal control, sensor short-circuit control
Fault limit:	1.0% of relative temperature
Actual / rated value:	3-digit LED-display (13 mm) scan-operation between channel 1 and 2
Display / measurement range:	-199 up to +999 digits
Controller output A:	via 2 internal Triacs, max. power 1200 W both channels together
Controller output B:	via 2 mechanical switching relays 16 A, switching power 2 x 1500 W at 230 V AC
Controller output C:	2 x 12 V DC to trigger Solid State Relays for switching high powers
Configuration:	as double-controller, each channel separately configured as Safeguard, one channel surveying the other as controller / limiter
Special functions:	Self-optimizing of controller parameters, easy adaption to respective environment Safety operation mode by connecting the relays before the Triac control to switch off on false alarm Setting limits and setting correction adjustable Fastening on 35 x 7.5 mm carrier rail per DIN 50022
Optional:	2 independent 4 - 20 mA inputs for external setting of both channels; equipped with multipole sockets matching our complete heating system
Protection grade:	IP 40, with housing IP 65
Protection class:	I without housing, II with housing
Measurements:	72 x 70 x 90 mm (H x W x D)
Connections:	Pluggable connectors
Operation:	Parameter assignment and configuration using four pushbuttons

Series HLD 55

Thermostat for high operational currents

Three-phase or deviating voltages can be switched to a floating contact via a fitted contactor.
The modern wall housing can be simply assembled and the fitted microprocessor controller is programmable for every task.
This version is also available as a multi-channel controller HTM.

Switching power:	with cutout 3 x 4.6 kW (20 A) with SSR-relay 1 x 5.7 kW
Controller for fitment:	HT 55 (data see page 88)
Input voltage:	230 Volt / 500 Volt
Cable inputs:	KV-screwed
Terminals:	2.5 - 4 mm²
Protection class:	II
Protection grade:	IP 65 (EN 60529)
Housing:	Polystyrene (with transparent cover), hinged cover
Housing dimensions:	161 x 166 x 96.5 / 121 mm (L x W x H)

Series HTM 55

Multi channel controller

Controller circuits:	4 -10
Switching power:	per circuit Triac 600 Watt Relais 1500W
Voltage:	230 Volt / 400 Volt AC
Controller for fitment:	HT 55 (data see page 88)
Cable inputs:	KV-screwed
Protection class:	II
Protection grade:	IP 65 (EN 60529)
Housing:	Polystyrene (with transparent cover), hinged cover
Housing dimensions:	depend on number of controllers

Series HT 52

Self-programmable microprocessor controller 96 x 96

Maximum protection of high-capacity heaters is achieved through the start-up circuit and subsequent drying phase. Practical functions such as self-optimisation, heating circuit control, setting acceptance where there is a sensor breakage, etc., characterise these controllers to give your equipment and machines maximum safety and reliability as well as helping to lower your production costs or those of your customers.
The electronic controller HT 52 is also available in the dimensions 96 x 48.

Operating temperature:	-15°C to +50°C
Power supply:	230 Volt AC / 50 Hz or 24 Volt DC
Noise immunity:	EN 50 082-2
Emitted interference:	EN 50 081-1
Sensor type:	Fe-CuNi (L, J), NiCr-Ni (K), PT 100 DIN/IEC
Sensor breakage safe-guard:	X > W or X < W, sensor polarity reversal con-trol, sensor short-circuit control
Fault limit:	0.1% - 0.2% of the range
Actual / rated value:	4-digit LED-display (13 mm)
Display / measurement range:	-199 up to +999 digits
Deviations:	3°C-steps, 7 LEDs, Variation display for > ±12°C
Controller outputs:	Actuation conditions displayed on 3 LEDs
Controller output 1:	6 A / 230 Volt, actuating output: as a two-point controller relay configuration (factory setting) the heating or cooling (cutout) is connected; as a two-point controller logic configuration (selectable), it has an alarm function, with the setting being input via output 3 (logic)
Controller output 2:	6 A / 230 V, Relay output, in two-point con-figuration as an alarm output, in three-point configuration as a cooling output
Controller output 3:	Analog signals 0 to 20 mA for actual value, rated value or setting of the continuous control-ler; logic level 0 / 6 V (SSR relay) for alarm functions or the setting of the two/three-point controller
Optional:	Serial interface RS 232 or RS 485, pluggable load feeders up to 25 A, also three-phase
Special functions:	self-optimizing during control or during run-up, operating hour meter, start-up ramp
Housing material:	Noryl, glass-fibre reinforced
Protection grade:	IP 54 (EN 60529) Front panel IP 10 (EN 60529) Housing
Front dimensions:	96 x 96 mm according DIN 43 700
Control panel cutout:	app. 92 x 92 mm
Installation depth:	app. 85 mm
Connections:	Screw terminals
Storing temperature:	-25°C to +75°C
Weigth:	app. 250 g
Operation:	Parameter assignment and configuration using four pushbuttons

Series HT 53

Electronic plain thermostat

The dimensions of this controller are equivalent to two standard built-in cutouts and can be easily installed in control cabinets and distribution fuse-boards.
The temperature is registered via a PT 100.

Rated temperature setting:	using an external knob
Opener function:	(standard) relais released with x w
Controller output:	Relay with floating changeover contact 10 A
Actuation difference:	adjustable between 0.25 and 5%, set in the factory to the minimum value
Power supply:	AC 230 V ±10%, 50 / 60 Hz
Electrical connection:	Screw terminals
Cable cross section:	max. 1 x 4 mm²
Installation width:	35 mm
Enclosed controller:	for fastening on mounting rail, 35 mm according DIN 50 022

Installation housing:	
Housing dimensions HZ-EK 2:	for 2 units 110 x 180 x 110 mm
Housing dimensions HZ-EK 4:	for 4 units 182 x 180 x 110 mm
Housing dimensions HZ-EK 6:	for 6 units 254 x 180 x 110 mm
Protection grade:	IP 20 (EN 60529) without housing IP 65 (EN 60529) in installation housing
Model:	according to VDE 0631

Sensor type: Pt 100	
	Control range
HT 53 – 40	-20 up to +40 °C
HT 53 – 100	0 up to +100 °C
HT 53 – 200	0 up to +200 °C

Series UTR

Thermostat for wall fitment

This is a simple and inexpensive thermostat with PTC sensor, with internal and external adjustment of the rated value.
It is fitted in a housing and handles the simple temperature control of heating strips and underfloor heating systems.
The PTC temperature sensor can be extended by up to 50 m.

Operating voltage:	230 V, +6 / -15%, 50 / 60 Hz
Display:	LED „Heating on“, „Sensor break“
Accepted ambient temperature:	-10° to +50°C
Actuation temperature difference:	adjustable approx. 10 K
Max. permissible actuation current:	16 A / 250 V
Switching power:	4 kW
Contact (relay contact):	1 changeover contact, floating
Electr. connection:	Screw terminals
Rated value setting:	Knob
Housing material:	Plastic
Housing fastening:	Surface mounted
Protection grade:	IP 54 (EN 60529)
Protection class:	II
Housing dimensions:	120 x 122 x 56 mm (W x H x D)
Cable input:	3 x PG 11

Sensor (optional):	(PTC) linearised, self-monitoring
Cable length:	1.5 m
Sensor diameter:	8.5 mm
Ambient temperature:	-20° to +175°C

Controller	Control range
UTR-60	0 – 60 °C
UTR-100	40 – 100 °C
UTR-160	100 – 160 °C

Temperate sensor PTC
UTR-175-PTC

Series AZT

Electronic antifreeze controller

This is an inexpensive electronic antifreeze controller, with internal or external setting of the rated value.
When the external temperature drops, depending on the setting, it switched the heating on for antifreeze protection, and switches off again when the external temperature rises.

Operating voltage:	230 V, +6 / -15%, 50 / 60 Hz
Display:	control lamp: „Heater on“
Temperature range:	-15° to +15°C
Max. permissible switched current:	10 A / 250 V
Switching capacity:	2.2 kW
Contact (relay contact):	1 changeover contact
Permissible ambient temperature:	-20° to +40°C
Switching temperature difference:	app. 0.5 K
Sensor element:	NTC linearised, in housing
Housing material:	Plastic
Protection grade:	IP 54 (EN 60529)
Protection class:	II
Mounting:	wall mounting
Housing dimensions:	90.8 x 90.8 x 53 mm (W x H x D)

Series HTL 13

Interval power output

The Hillesheim HTL 13 is suitable for automatic, infinite temperature control of electrical heating systems and devices. The consumer is connected via a built-in flange socket. Infinite temperature control is achieved by automatically switching the electrical supply on and off in precise time intervals. The operating time of the power supply can be infinitely set using the control knob on the power output. This means that with a low setting the power output cycle is short on – long off, with a higher setting the power output cycle is short off – long on.

Operating voltage:	230 V ~, 50 / 60 Hz
Controllable heat rating:	2990 W (max. 13 A)
Temperature setting:	Control knob / scale
Switching cycle:	Depending on setting 10 - 80%, or max. 100%
Protection class:	I
Protection grade:	IP 54 (EN 60529) in plugged condition

Power cable:	
Length:	1.3 m
Plug type:	Euro 16 A
Steckerdose:	Hirschmann STAKEI 200, 2 + PE
Housing:	Polycarbonate, grey
Dimensions:	80 x 80 x 80 mm (W x H x D)

Series HE / HER
Electronic load relay

Electronic load relay SSR 25 A

The HER 25 load relay is a ready to install electronic power controller unit for electrical heating. It should be used for continuous operation with a high actuation frequency. By comparison to the electromechanical relay or contactor, no wear to the actuation contacts is possible.
HER 25 is prepared for DIN rail use (TS 35), completely fitted with heat sink as well as over-voltage protection.

Load voltage:	24 - 230 V AC
Load current:	0.2 - 25 A AC 1
Protection class:	II
Protection grade:	IP 20 (EN 60529)
Terminal cross section:	10 mm²
Ambient temperature:	max. 40°C 25 A, max. 60°C 20 A
Housing dimensions:	120 x 45 x 1100 mm (H x W x D)

	Control voltage
HER 25 D	5 – 24 V DC
HER 25 A	24 – 230 V AC

Solid state relay - set SSR 20 A

This electronic relay can be installed anywhere in a housing in a space-saving manner.
For high load currents, fitment in a metal housing is recommended, so as to ensure adequate cooling.

Load voltage:	24 to 280 V AC 1 (600 V peak)
Load current:	0.2 to 25 A AC 1 (max. load)
Protection class:	I
Protection grade:	IP 20 (EN 60529)
Heat loss:	For a switch capacity exceeding 5 A, steps must be taken to ensure adequate cooling.
Housing dimensions:	45 x 57 x 23 mm (H x W x D)
Note:	Even when not energized, solid state relays allow residual current to flow. For this reason, fit a mains switch or contactor upstream.

	Control voltage
HED	3 – 32 V DC
HEA	90 – 280 V AC

Series HTK

Mechanical two-point controller

This capillary tube controller is suitable for simple temperature control or monitoring, for example for antifreeze and roof gutter heating. It is available in three temperature ranges.

Rated voltage:	230 V, 50 / 60 Hz
Switching power:	3600 W AC 1 (16 A)
Switching hysteresys:	5 K
Protection class:	II
Protection grade:	IP 65 (EN 60529)
Precision category:	5%
Control response:	P
Clamp diameter:	2.5 mm²
Power control:	via spring contact
Housing:	ABS, Polycarbonate
Housing dimensions:	160 x 80 x 75 mm (H x W x D)

	Control range
HTK 40	0 – 40 °C
HTK 85	0 – 85 °C
HTK 200	50 – 250 °C

Series HT 54

SMD miniature control unit

In former times, the idea to install a temperature control device directly into the corresponding heating system failed because of the large constructional elements.
Today's SMD technology needs only a fraction of the space required by earlier electronics. This prompted us to develop a complete temperature control device for installation in the upper part of the PA hard cap in our heating hoses.
The HT 54 is the result!
We have accommodated the control board on a surface area of only 35 x 40 mm. The customer can save external control devices as a result of this construction. This creates space in the switch cabinet. The HT 54 can also be utilised in the same manner for control purposes in heating sleeves or tapes. Its small dimensions open up new fields of application.

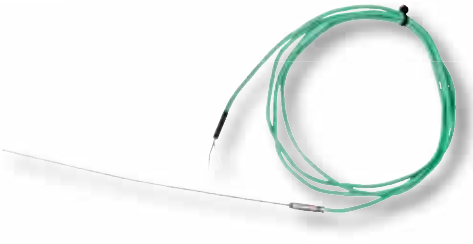
Rated voltage:	230 V / 50 Hz
Switching power:	1000 W / 5 A
Power switch:	Triac in zero passage
Controller area:	0 ... 254°C
Setting:	Rated value 2°C steps above DIP
Display:	Heating operation yellow LED
Housing material:	PA-glass-fibre reinforced
Degree of protection:	IP 42 / sealed-in: IP 65 (EN 60529)
Controller response:	Two-point-controller
Sensor:	PT 100
Cable inputs:	Cable screws

Heating tape sensor

Thermocouple flat sensor +450 °C

with 1.5 m long silicone insulated equalizing cable

Order Nr.	Sensor type
HT/FF	Fe-CuNi(J)
HT/NF	NiCr-Ni(K)



Thermocouple bar sensor +600 / +1000 °C

Mineral insulated, sensor tip bendable, can be soldered, preferably for use at high temperatures, in fluids and in corrosive atmospheres, diameter 1.5 mm, length 250 mm, silicone insulated, 2 m long equalizing cable

Order Nr.	Sensor type	Max. temperature	Jacket material
HT/FM	Fe-CuNi(J)	600 °C	1.4571
HT/NM	NiCr-Ni(K)	1000 °C	2.4816 (Inconel)

Pt 100 sensor +200 °C

Brass
diameter 4 mm,
length 30 mm,
PTFE insulated,
2 m cable

Pt 100 sensor +250 °C

Jacket material 1.4571,
diameter 4 mm,
length 40 mm,
PTFE/glass fil. insulated,
2 m cable

Pt 100 sensor +350 °C

Jacket material 1.4571,
diameter 4 mm,
length 40 mm,
glass filament insulated,
2 m cable

Order Nr.	Order Nr.	Order Nr.
HTI/MS	HTI/PM	HTI/PH

Pt 100 also available in ex-proof.

Compensating cables

For extending the connection cables of the temperature sensors listed above. Structure: silicone/silicone insulated, 2 x 0.25 mm², diameter 5 mm

Order Nr.	Sensor type
AG/F	Fe-CuNi(J)
AG/N	NiCr-Ni(K)

Notes

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